ACCOLADE 2000

DESIGN, INSTALLATION AND SERVICING INSTRUCTIONS

PLEASE LEAVE THESE INSTRUCTIONS IN THE POCKET PROVIDED ON THE BACK OF THE FRONT PANEL

kiwa approved product

UK WATER SUPPLY REGULATIONS

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UK BUILDING REGULATIONS

benchmark™

The code of practice for the installation, commissioning & servicing of central heating systems

An unvented hot water storage unit complying with the requirements of Building Regulations Approved Document G3.

Please read these instructions before commencing installation and on completion leave adjacent in the pocket on the back of the appliance front panel.

In the interest of continuously improving the Accolade^{2000} range, Gledhill Water Storage Ltd reserve the right to modify the product without notice, and in these circumstances this booklet, which is accurate at the time of printing, should be disregarded.

ISSUE 2: 06-08

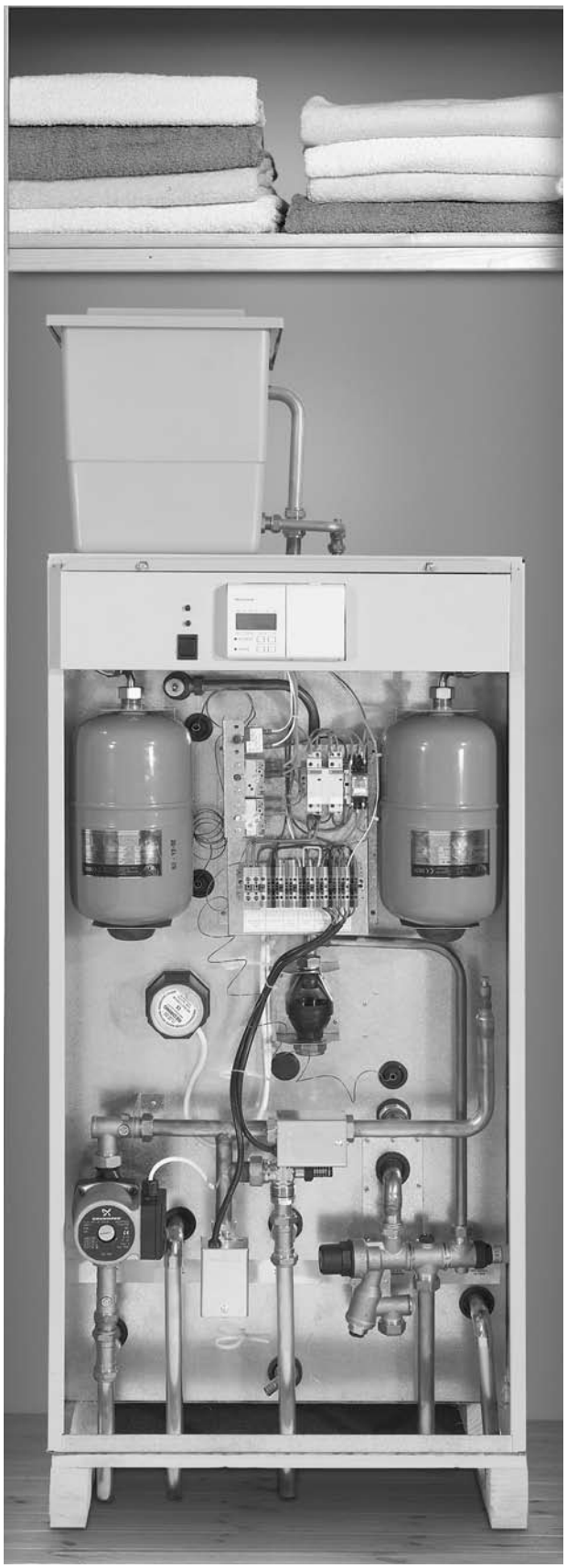
benchmark™

The code of practice for the installation, commissioning & servicing of central heating systems

As part of the industry wide "Benchmark" Initiative all Gledhill Accolades now include a Benchmark Installation, Commissioning and Service Record Log Book. Please read carefully and complete all sections relevant to the appliance installation. The details of the Log Book will be required in the event of any warranty work being required. There is also a section to be completed after each regular service visit. **The completed Log Book and these instructions should be left in the pocket provided on the back of the front panel.**

1.0 DESIGN

1.1 INTRODUCTION



The Accolade^{2000} range of floor standing directly and indirectly heated unvented hot water storage appliances is designed to provide domestic hot water at mains pressure. The direct models are fitted with two 3kW immersion heaters and are designed for electric hot water heating only.The indirect models are designed for gas or oil fired heating and hot water systems with boiler capacities up to a maximum of 45kW. All indirect models are fitted with a 3kW immersion heater for heating domestic hot water in the event the boiler fails. The Accolade^{2000} appliances are factory fitted with all the necessary safety and control equipment for connecting it to the cold water mains, boiler and heating system.

These instructions cover all the models and must be followed. These appliances have been certified for safety and therefore it is important that these instructions are followed. The appliance and installation specifications of the appliances must not be modified unless recommended by Gledhill Water Storage Limited.

SAFETY

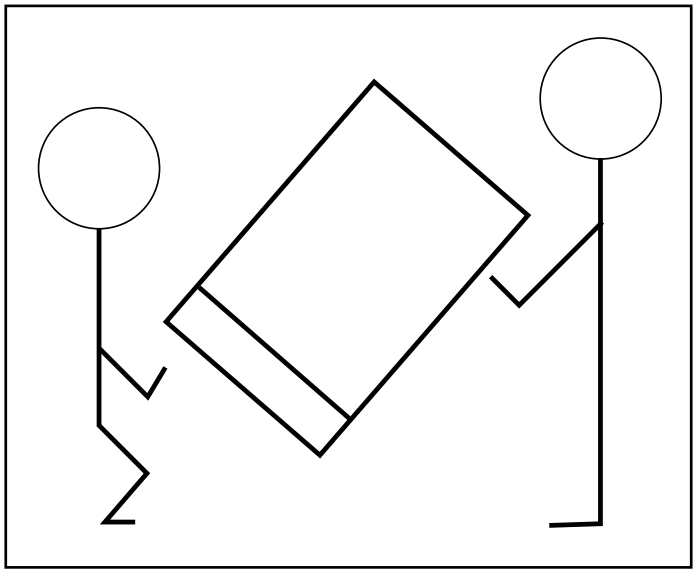
1. The Building Regulations (Approved Document G3) 2002 cover the installation of unvented storage water heating equipment and these require that the installation of an unvented unit shall only be carried out by a person competent to do so (as defined in the Approved Document) and that the Local Authority shall be notified of the intention to carry out the installation of one of these types of appliances.

2. The system must be installed in accordance with the Water Supply Regulations, Building Regulations and relevant NHBC requirements.

3. As the Accolade 2000 is an unvented appliance it should not be used where steam is the primary heating medium, or with solid fuel boilers, or in situations where annual inspection/maintenance is likely to be neglected.

1.0 DESIGN

1.1 INTRODUCTION



IMPORTANT NOTICES

1. **Handling and Storing the Appliance**

This appliance should be handled carefully to avoid damage and the recommended method is detailed below.

When lifting the unit:-

- Use a team lift
- Work with someone of similar build and height if possible.
- Choose one person to call the signals
- Lift from the hips at the same time, and then raise the unit to the desired level.
- Move smoothly in unison.

The appliance is supplied shrink wrapped on a timber installation base. Carrying handles are provided towards the top of the left hand side of the casing and at the bottom of the opposite side.

If the unit needs to be stored prior to installation it should be stored upright in a dry environment and on a level base/floor.

Note: Although the above guidance is provided any manual handling/lifting operations will need to comply with the requirements of the Manual Handling Operations Regulations issued by the H.S.E.

The appliance can be moved using a sack truck on the left hand face although care should be taken and the route should be even. In apartment buildings containing a number of storeys we would recommend that the appliances are moved vertically in a mechanical lift. If it is proposed to use a crane expert advice should be obtained regarding the need for slings, lifting beams etc.

2. **System Installation**

Any installation must be in accordance with the relevant requirements of the current issue of Local Building Regulations, the Water Supply Regulations, Health & Safety Document No. 635 and the Electricity at Work Regulations 1989. The detailed recommendations are contained in the current issue of the following British Standards and Codes of Practices: -

BS 5440 Pts. 1 & 2; BS 5449; BS 5546; BS 7074 Part 1; BS 6700; BS 6798; BS 6891, BS 7593, IGE/UP/7/1998

3. **Equipment Selection**

This information is provided to assist generally in the selection of equipment. Responsibility for selection and specification of our equipment must, however, remain that of our customers and any expert or consultants concerned with the installations).

Please note: -

We do not accept any responsibility for matters of design selection or specification or the effectiveness of an installation containing one of our products unless specifically asked in writing to do so.

All goods are sold subject to our Conditions of Sale which are set out in the Appendix to this document.

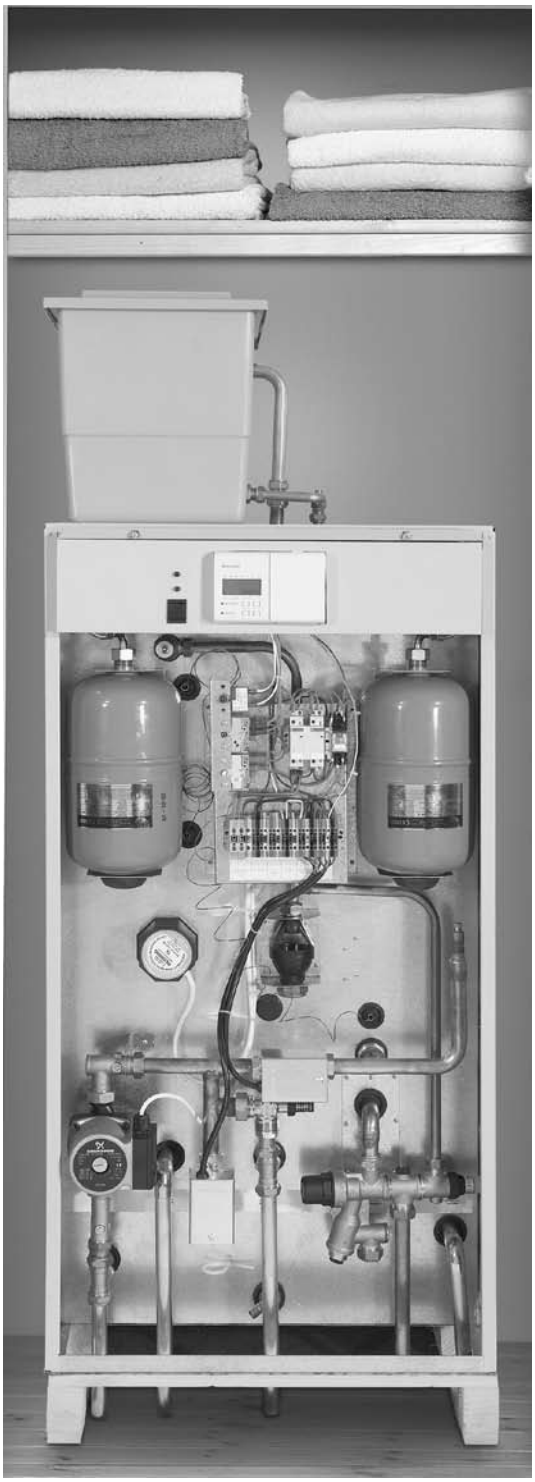
Warning

To comply with the Building Regulations requirements this appliance must be serviced and installed by a competent person suitably trained and registered to install unvented heating system equipment.

As part of the industry wide 'Benchmark' initiative all Accolade 2000 appliances now include a Benchmark Installation, Commissioning and Service Record Logbook. Please read this carefully and complete all sections relevant to this appliance. Failure to do so may affect warranty.

Modifications should NOT be made to this product. If any components in this appliance are replaced and re-commissioned in the field then these must be obtained from Gledhill Water Storage Ltd to ensure continued safe operation and must not be tempered with. This applies particularly to the immersion heaters which must incorporate an overheat thermostat.

1.1 INTRODUCTION



Description

The Accolade 2000 is a floor standing packaged mains pressure unvented hot water appliance and uses a twin copper cylinder configuration which ensures that all the water content is heated to a uniform temperature as well as reducing the risk of legionella and corrosion. All cylinders are manufactured in accordance with the requirement of BS7206:1990. All models of the Accolade are factory fitted with all the necessary safety and control equipment for connecting it to the domestic water systems, the boiler and the heating system (see table 1.1).

The indirect models shown in figure 1.1 are designed to be heated indirectly by a gas or oil fired boiler and are available for use with both open vented and sealed heating systems. These appliances are also fitted with a 3kW immersion heater for heating the hot water in the event of a boiler failure. The immersion heater is factory wired into the appliance control panel and does not require a separate electricity wiring supply.

The direct models shown in figure 1.2 are fitted with two 3kW immersion heaters and are designed for electric hot water heating only usually utilizing off peak electricity.

Models AC180_ID, AC210_ID, AC175_D and AC210_D are fitted with a secondary return tapping as standard. If secondary hot water circulation is installed, then an additional expansion vessel may be necessary. Typical primary hot water circulation system design is discussed further in section 3 of this manual.

1.2 TECHNICAL DATA

Table 1.1 Factory fitted and supplied components			
	Indirect Models		Direct Models
	AC125_ID_OV AC150_ID_OV AC180_ID_OV AC210_ID_OV	AC125_ID_SS AC150_ID_SS AC180_ID_SS AC210_ID_SS	AC140_D AC175_D AC210_D
Factory fitted and wired standard equipment			
1. Mains pressure inlet control group consisting of Non-return valve, Pressure regulator, Strainer, Expansion relief valve and balanced cold water outlet	Yes - Non adjustable factory set operating pressure - 1.5 bar		
2. Pressure and Temperature (P&T) relief valve	Yes - Non-adjustable factory set operating pressures		
3. Tundish	Yes		
4. Safety thermostat	Yes - manual reset, non adjustable and not accessible to user		
5. High limit thermostat	Yes - manual reset, non adjustable and not accessible to user		
6. Control thermostat	Yes, Adjustable, not accessible to user		
7. Anti-vacuum valve	Yes		
8. Wiring centre	Yes		
9. Domestic hot water expansion vessel(s)	Yes		
10. Hot water zone valve	Yes		
11. Space heating zone valve	Yes		
12. System pump	Yes		
13. Automatic bypass valve	Yes		
14. 2 Channel (heating and hot water) programmer	Yes		
15. 3kW immersion heater with thermostats	Yes - 1 off (for backup in case of boiler failure		Yes, 2-off
16. Anti-vacuum valve			
17. Drain cock	Yes		
Sealed System Kit - supplied as standard for onsite installation with SS models			
1. Pressure gauge		Yes	
2. Primary (heating) circuit expansion vessel		Yes	
3. Filling loop		Yes	
4. Expansion relief valve		Yes	
Open Vented Kit - supplied as standard for onsite installation with OV models			
5. Feed and Expansion cistern with lid	Yes		
6. Ball valve and float	Yes		
7. Over flow and cold feed tank connectors	Yes		
Optional Extras- to be requested at time of order			
Room thermostat - Honeywell T6360	Yes	Yes	
Flexible connection kit	Yes	Yes	Yes
Grundfos UPS 15/60 pump	Yes (125 & 180 only)	Yes (125 & 180 only)	
ID-OV: System appliance suitable for open vented heating systems only ID-SS: System appliance supplied with kit for use with sealed heating systems			

1.2 TECHNICAL DATA

Indirect model photo
Figure 1.1

Direct model photo - T.B.A. when available
Figure 1.2

1.2 TECHNICAL DATA

Model Selection Guide

General selection criterion is shown in Technical Data table 2.1. However, before selecting the model, the hot water requirements of the dwelling should be correctly assessed. If the appliance is to be installed in a cupboard, then the minimum dimensions and clearances specified in figure 1.4 must be observed.

Appliance Location

The Accolade must be installed on a flat surface, which is capable of supporting the weight of the appliance and any other ancillary equipment.

The minimum airing cupboard dimensions and the clearances required for installation and service are shown in figure 1.3.

The appliance is designed to be installed on the plinth supplied with the appliance. The pipe connection arrangements for the direct and the indirect models are shown in figures 1.4 and 1.5.

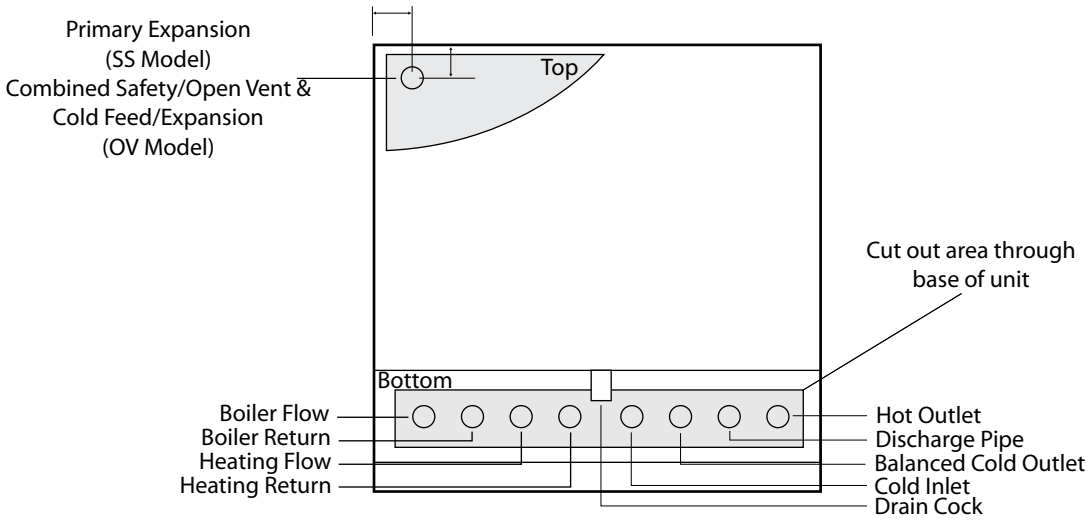


Figure 1.4 Connection Arrangement - Indirect

Figure 1.5 Connection Arrangement - Direct

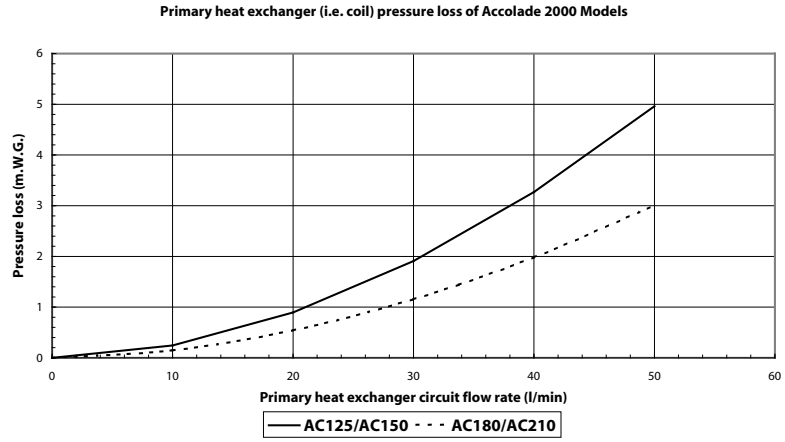


Figure 1.6 Net pump head available - Hot water only on

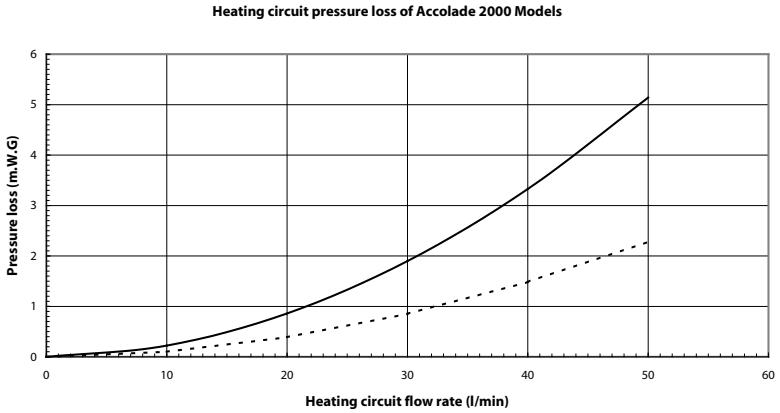


Figure1.7 Net pump head available - Heating only on

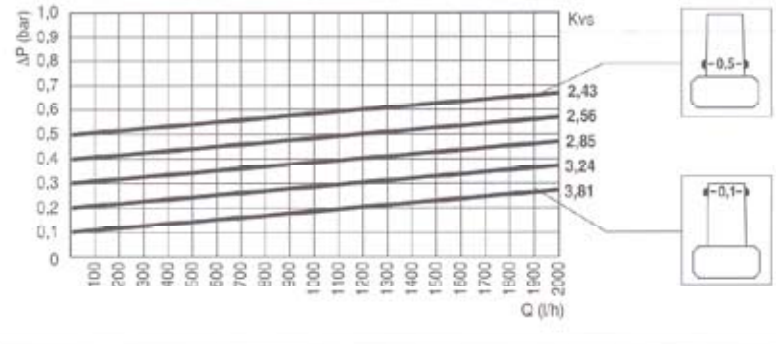


Figure 1.8 Automatic bypass valve characteristics

Figure 1.9 Hot water flow rates from Accolade 2000

1.2 TECHNICAL DATA

a. General technical and performance data of the Accolade 2000 range is given in table 2.1.

b. The indirect models are fitted with high performance primary heat exchangers and are supplied with either Grundfos UPS 15-50 or UPS 15-60 factory fitted pumps. The net pump head available when hot water only is on and when space heating only is on is shown in figures 1.6 and 1.7 respectively. The control characteristic of the automatic bypass is shown in figure 1.8.

c. In these appliances the mains inlet pressure regulating valve is set to 1.5 bar and this setting MUST NOT be adjusted. Therefore the flow rate from the appliance depends upon the resistance of the hot water supply network, capacity of the incoming mains and the characteristics of the pressure regulating valve. Typical hot water flow rates for different pressures are shown in figure 1.9.

1. 2 TECHNICAL DATA

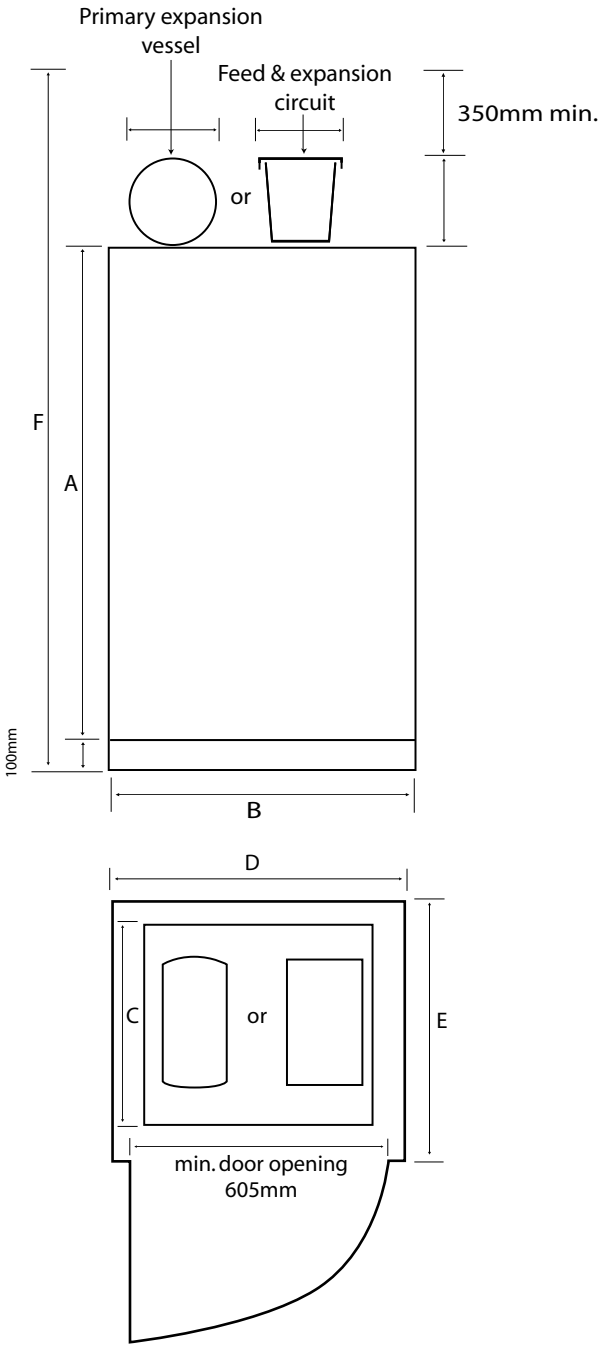


Figure 1.3 Minimum cupboard dimensions

Appliance Dimensions			
Model	**Height (A)**	**Width (B)**	**Depth (C)**
120 ID	1140	595	595
150 ID	1370	"	"
180 ID	1600	"	"
210 ID	1950	"	"
140 D	1370	"	"
175 D	1600	"	"
210 D	1950	"	"

Note: The appliance dimensions do not allow for the 100mm base.

Minimum Cupboard Dimensions			
Model	**Height (F)**	**Width (D)**	**Depth (E)**
120 ID	1890	700	600
150 ID	2120	"	"
180 ID	2350	"	"
210 ID	2700	"	"
140 D	1300	"	"
175 D	1750	"	"
210 D	2100	"	"

The table of minimum cupboard dimensions only allow the minimum space required for the appliance (including the F & E cistern and expansion vessel) and any extra space required for shelving etc in the case of airing cupboards etc must be added.

The dimensions above are for the OV model and based on the appliance and the F & E cistern being in the same cupboard.

For the SS model 300 mm can be deducted from the height.

1.2 TECHNICAL DATA

Electricity Supply

Only one mains supply rated at 16A, 230V~, 50Hz is required for the indirect models. All indirect models have a 3kW electric immersion heater for hot water backup in case of boiler failure. The immersion heater and boiler circuits are fused internally.

The direct models have two 3kW immersion heaters and therefore require two (usually one on-peak and one off-peak) supplies and both should be at 16A, 230V~, 50Hz.

Minimum external fuse rating and the main supply cable ratings are give in "Electrical Wiring" section of this manual. All fuses must be ASTA approved to BS 1362. This appliance **MUST BE EARTHED.**

All external wiring to the appliance must be in accordance with the latest I.E.E. Wiring Regulation, and any local regulations which may apply.

There must be only one common isolator, for the Indirect Accolade appliance, the boiler and any external controls. It must provide complete electrical isolation for the whole heating and hot water system via a fused double pole isolator with a contact separation of at least 3mm in both poles.

There must be two isolators for the Direct Accolade, one for the on-peak supply and one for the off-peak supply. These must provide complete electrical isolation for the system via a fused double pole isolators with a contact separation of at least 3mm in both poles.

In both the above situations the isolators should be within 1 metre of the Accolade unit.

It is normal to fit a separate (not supplied) off peak hot water controller adjacent to the direct Accolade unit.

In the event of an electrical fault after installation of the appliance, preliminary electrical checks must be carried out i.e. Earth Continuity, Short Circuit, Polarity, and Resistance to Earth.

Table 2.1 Technical specification of Accolade 2000							
	Indirect Models				Direct models		
	AC125_ID_OV AC125_ID_SS	AC150_ID_OV AC150_ID_SS	AC180_ID_OV AC180_ID_SS	AC210_ID_OV AC210_ID_SS	AC140_D	AC175_D	AC210_D
Nominal volume (litres)	120	150	180	210	140	175	210
Weight (kg) · Empty / Full	74 / 192			118/333			
Hot water capacity (litres)							
Recovery time (minutes)[-1]							
Heat loss rate (W)[-2]							
Primary heat exchanger water content (litres)							
Domestic hot water expansion vessel - Charge pressure (bar) - Volume (litres)	1.5 10.0	1.5 15.0	1.5 15.0	1.5 20.0	1.5	1.5	1.5
Maximum mains inlet pressure	6.0 bar (At inlet to the appliance)						
Hot water operating pressure	1.5 bar (Pressure regulating valve i.e PRV setting)						
T & P relief valve - Operating pressure setting - Operating temperature setting	4.0 bar 90ºC						
Expansion relief valve setting	3.0 bar (Domestic water)						
Control thermostat setting	60ºC (Adjustable, not accessible to user)						
High limit thermostat setting	85ºC (Manual re-set required, not accessible to user)						
Overheat safety thermostat	95ºC (Manual re-set required, not accessible to user)						
Top immersion heater - Type - Thermostat settings	Redring type GU 11 TC (incaloy sheath) Control: 60ºC, Overheat:80ºC						
Bottom Immersion heater					Same as top		
Heating zone valve	22mm		28mm				
Hot water zone valve	22mm		28mm				
System pump	Grundfos UPS 15-50		Grundfos UPS 15-60				
Heating programmer	Honeywell 2-Channel digital, Type						
Heating system bypass valve	Automatic - supplied set at 2.0m head						
Water connections - Mains cold water - Hot water outlet - Secondary return - Tundish	22mm compression 22mm copper pipe 22mm copper (AC180 & 210 only) 28mm compression			22mm 28mm 22mm 28mm	22mm 22mm 22mm (AC 175 only) 28mm		28mm 28mm 22mm 28mm
Heating circuit connections - Heating flow and return - Boiler flow and return - Cold feed/expansion vessel	22mm copper pipe 22mm copper pipe 15mm copper pipe		28mm 28mm 15mm				
Sealed system components	**AC125_ID_SS**	**AC150_ID_SS**	**AC180_ID_SS**	**AC210_ID_SS**			
Pressure relief valve setting	3.0 bar						
Primary expansion vessel - Charge pressure (bar). Factory setting - Volume (litres)	1.0 7.5	1.0 10.0	1.0 12.0	1.0 18.0			
Typical Dwelling types							
Bedrooms	2-3	2-4	3-4	3-5	2-3	2-3	3-4
Bathrooms	1	1	2	2	1	1	2
En-suite shower rooms	1	2	1	2	0	1	1

Notes:
1. The direct models are designed to be heated by cheap off-peak electricity. Therefore electricity utilities should be consulted about supply tariffs and model selection.
2. The above recommendations for the direct models are based on the use of the E7 tariff.

1.3 SYSTEM DETAILS

Hot and Cold Water System

a. All recommendations with regard to pipe work systems in this manual are generally based on the use of BS/EN Standard copper pipework and fittings.

b. However a plastic pipework system can be used in place of copper internally as long as the chosen system is recommended by the manufacturer for use in cold and hot water systems and is designed and installed fully in accordance with their recommendations.

c. This is particularly important in relation to use of push fit connections when using the optional flexible hose kits (See Installation and Wiring section of this document),

d. It is also important that if an alternative pipework material/system is chosen, the manufacturer confirms that the design criterion for the new system is at least equivalent to the use of BS/EN Standard copper pipework and fittings.

Mains cold water supply

a. Accolade 2000 is designed to be connected directly to the mains without a check valve. The hot water flow rate achievable from the Accolade 2000 is directly related to the adequacy of the cold water mains serving the property. For this reason the cold water supply to the dwelling must be capable of providing for those services which could be required simultaneously and this maximum demand should be calculated. Also if a water meter is fitted its nominal rating should match the anticipated maximum simultaneous hot and cold water demand calculated in accordance with BS 6700. This could be 60 litres per minute in some properties. 30 litres per minute is the minimum flow rate which is recommended for an adequate mains pressure system to any property.

b. The Accolade 2000 is fitted with a pressure regulating valve set to provide a static operating pressure of 1.5 bar. On this basis there must be at least 2.0 bar pressure at the inlet to the appliance. This pressure must be dynamic (not static) and be available at the appliance when local demand is at its maximum. For optimum performance we would recommend that the dynamic pressure is in the range of 2.5 - 3.5 bar.

1.3 SYSTEM DETAILS

c. As a general guideline, although a 15mm service my be sufficient for smaller dwellings with one bathroom, a 22mm service (25mm MDPE) is preferred and should be the minimum for larger dwellings.

d. If the incoming mains pressure exceeds 6 bar at any time in a 24 hour cycle then a pressure regulating valve set at 3.5 bar should be fitted downstream of the stop tap where the cold supply enters the property.

e. Equipment used in the system should be suitable for a working pressure of up to 5 bar.

Cold and hot water distribution network

a. As a minimum it is recommended that the cold supply to the appliance internally is run in 22mm copper or equivalent in plastic and then from the appliance, hot and cold services are in 22mm past the draw-off to the bath as shown schematically in figure 2.1. For large properties bigger sizes will be necessary and these should be proved by calculation in accordance with BS6700.

b. The highest hot or cold water draw-off point should not exceed 4 metres above the appliance.

c. In typical dwellings, the cold water supply to any mixer fittings (other than dual outlet fittings) should be taken from the balanced cold outlet connection on the appliance. However, in larger dwellings with a number of bathrooms and en-suites and long pipe runs, the balanced cold supply must be provided with its own pressure regulating valve (set at the same pressure as the one provided with the appliance ie 1.5 bar static) and not taken from the appliance. When a separate pressure regulating valve is used for the balanced cold water supply, it is recommended that a small expansion vessel (0.25 - 0.5 litre) is fitted after the pressure regulator to accommodate the pressure rise caused by the increase in temperature of the balanced cold water.

d. Whenever possible the hot and cold water supply to a shower-mixing valve should be the first draw-off point on each circuit.

e. It is important that the cold water pipe work is adequately separated from any heating/ hot water pipe work to ensure that the water remains cold and of drinking water quality.

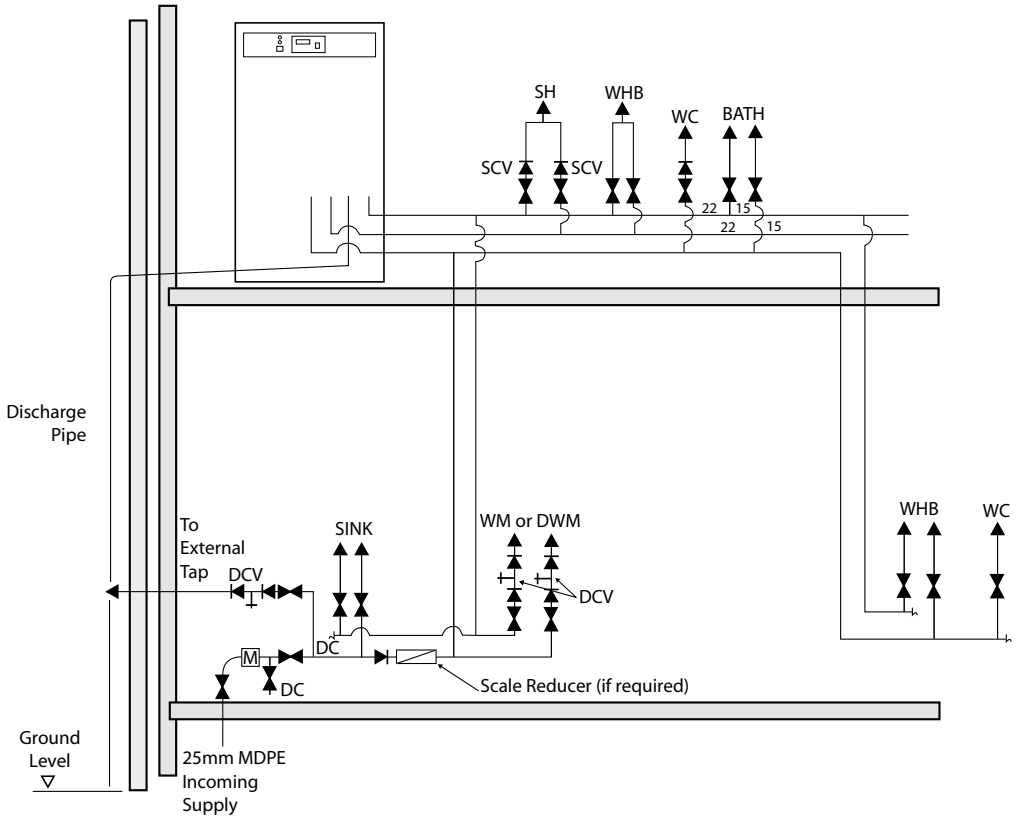


Figure 2.1 Typical cold and hot water network

Cold supplies to single taps taken from the mains cold water system.
Cold supplies to mixer taps only to be taken from the balanced cold water connection on the combination valve.

1.3 SYSTEM DETAILS

Taps and Shower Fittings

a. Ensure that all terminal fittings are suitable for mains pressure. Use aerated taps whenever possible to prevent splashing.

b. Aerated taps are recommended to prevent splashing. Any type of shower mixing valve can be used as long as both the hot and cold supplies are mains fed. However, all mains pressure systems are subject to dynamic changes particularly when other hot and cold taps/showers are opened and closed. To minimise the impact of this we would always recommend the use of thermostatic showers with this appliance.
The shower head provided must also be suitable for mains pressure supplies.
However, if it is proposed to use a 'whole body' or similar shower with a number of high flow/pressure outlets please discuss with the Gledhill technical department.

c. Note that the shower fittings must comply with the backflow prevention requirements (Para 15, Schedule 2) of the Water Supply Regulations 1999.

d. A bidet can be supplied from the Accolade 2000 appliance as long as it is of the over rim flushing type and incorporates a suitable air gap.

Dead leg volumes and secondary hot water circulation

If the dead leg volume of the hot water draw-off pipework is excessive and the delivery time for hot water to be available at the tap is more than 60 seconds you may consider using:-

a. Trace heating such as the 'Raychem HWAT' system. Please call Gledhill technical department for further details.
OR
b. A secondary hot water circulation system as shown schematically in figure 2.2.

Note:
It is not recommended that direct models utilizing an E7 tariff are provided with a secondary hot water circulation system.

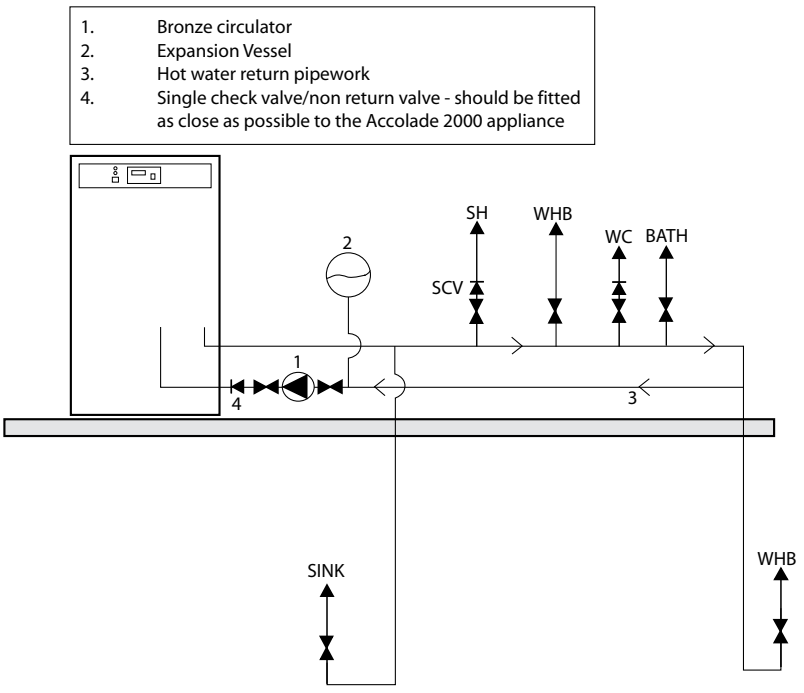


Figure 2.2 Schematic diagram of secondary hot water circulation

1. Hot flow and return pipework must be insulated
2. All components must be suitable for use on domestic unvented hot water storage systems

1.3 SYSTEM DETAILS

Space Heating System Design (Indirect models only)

General

Warning: Accolade^{2000} is an unvented hot water storage appliance and therefore it is not suitable for use with a solid fuel boiler, steam or any other uncontrolled heat source.

Model selection

Indirect Accolade^{2000} models '-OV' are suitable for open vented heating systems (figure 3.3) only.

The '-SS' models are supplied with a sealed system kit and are therefore suitable for sealed heating systems only (figure 2.3).

It is designed to be installed with any condensing or non condensing gas or oil fired boilers which has a controlled heat source and is suitable for sealed heating systems i.e. fitted with an overheat thermostat.

Although general model selection guidance is given in table 2.1 (section 1.2), it is recommended that the hot water demand should be determined before selecting the correct model.

Plastic pipework

All recommendations with regard to pipework systems in this manual are generally based on the use of BS/EN Standard copper pipework and fittings. However plastic pipework can be used in place of copper internally as long as it is recommended by the manufacturer and installed fully in accordance with their recommendations. Barrier type plastic pipework should always be used for these systems.

It is important to ensure that if the system is to be installed using plastic pipework it is designed and sized for plastic pipework. This is particularly important in relation to use of push fit connections to the appliance.

Boiler Sizing

The indirect Accolade^{2000} is designed to operate in a 'flow share' mode i.e. the boiler may supply space heating and hot water demands simultaneously. Therefore a hot water allowance should be included when sizing the boiler and heating system in accordance with BS 5449. The heating system design and installation must comply with the requirements of BS 6798 and BS 5449.

1.3 SYSTEM DETAILS

Frost protection

If it is necessary to protect parts of the heating system or the boiler which are installed in unheated spaces (e.g. garage, outhouse and ventilated roof space), a frost thermostat(s) must be fitted and wired as shown in section 5. The Accolade 2000 appliance should not be installed in a location where the contents could freeze.

User controls

The indirect Accolade2000 models are supplied with a factory fitted 2-channel digital heating and hot water programmer. A room thermostat will be required and this should fitted and wired to the appliance as shown in section 5 to meet the 'boiler interlock' requirements of Building Regulations, Part L.

System bypass

An automatic bypass valve is built into the appliance to allow thermostatic radiator valves (TRV's) to be fitted. To meet the requirements of Building Regulations for a boiler interlock it is recommended that the radiator in the area where the room thermostat is installed should be fitted with lock shield valves on both connections.

The bypass valve is set at the factory to 2m head but this should be adjusted on site by the installer to ensure that there is an adequate (the minimum flow rate recommended by the boiler manufacturer) flow rate through the boiler when TRVs are closed.

Pump head

The net pump head available when hot water only or space heating only are on is shown in figures 1.6 and 1.7 respectively. The net pump head available for sizing the boiler radiator circuit should be calculated using these figures.

Sealed central heating system

Sealed system kit

Only '–SS' Accolade models are suitable for sealed central heating systems and these are supplied with a sealed system kit consisting of:

- Expansion relief valve set at 3.0 bar
- Pressure gauge (0 – 4 bar)
- Primary expansion vessel charged to 1.0 bar, (Size depends upon the model, see table 2.1)
- WRAS approved primary system filling loop

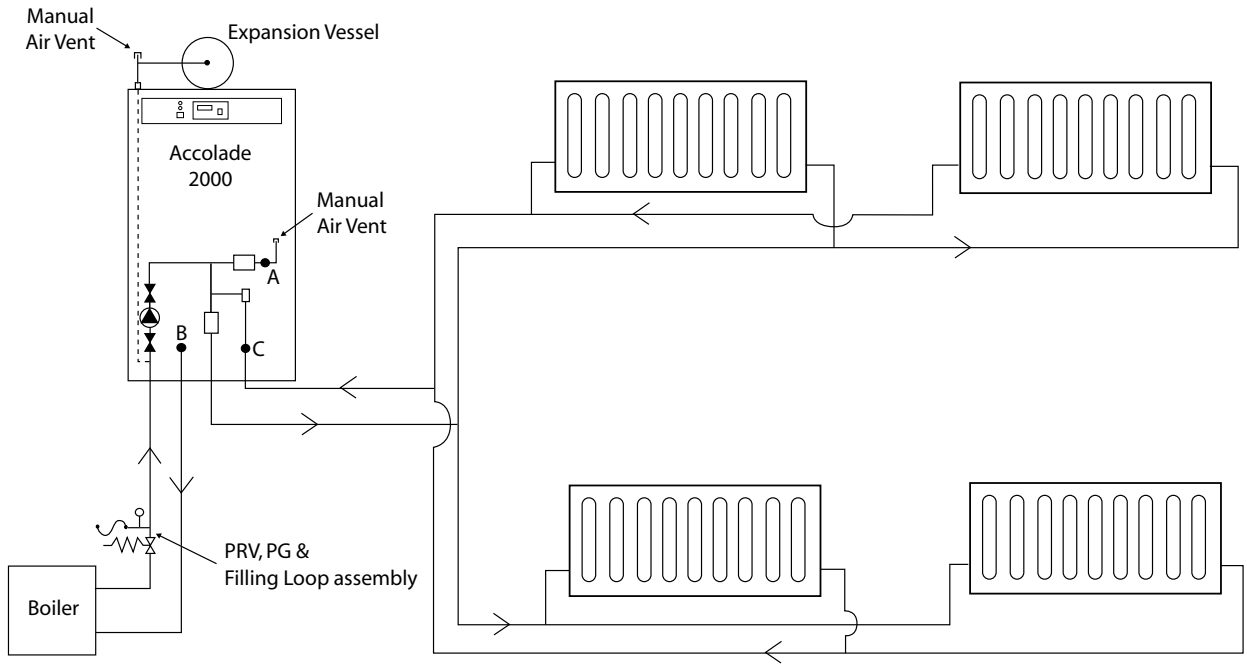


Figure 2.3 Schematic diagram of a sealed heating system

1.3 SYSTEM DETAILS

Pressure gauge and filling loop
Primary
The pressure gauge and the filling loop should be fitted at the system filling point which it is recommended should be adjacent to the boiler.

There shall be no permanent connection to the mains water supply for filling the system, even through a non-return valve without the approval of the Local Water Authority. The approved filling loop supplied with the appliance should be disconnected after commissioning the system.

Pressure relief valve
Primary
The pressure relief valve must be fitted in the boiler flow pipe adjacent to the boiler. There must no isolating valves or any such devices between the boiler and the pressure relief valve. The pressure relief valve should be fitted in a position where it is accessible for testing/ inspection.

The method of fitting should ensure that discharge of water or steam cannot create a hazard to persons in or about the premises or damage to electrical components or wiring and the point of discharge shall be clearly visible.

Expansion vessel
Primary
The expansion vessel is designed be sited on top of the appliance and connected to the 15mm copper pipe provided at the top of the appliance (see figure 2.3).

The expansion vessel must accommodate the change in volume of system water when heated from 10°C to 110°C (see BS 5449:1990 clause 16.2). When calculating the system water content, the water content of the primary heat exchanger (see table 2.1) must be included. The expansion vessel requirements are shown in table 3.1.

Note 1
After first filling the system to a pressure of 1.0 bar at mains supply temperature (typically 15°C in summer), the total system (space heating and hot water) should be heated to its maximum temperature. If the primary pressure gauge indicates 2.6 bar or higher, then an additional expansion vessel may be required.

Note 2
If the system pressure required is more than 1.0 bar, then the expansion vessel charge pressure should be adjusted to match the primary system pressure and the expansion vessel size recalculated accordingly.

Table 3.1 Primary expansion vessel requirements

Safety valve setting (bar)	3.0			
Initial vessel charge pressure (bar)	1.0		1.5	
Initial system pressure (bar)	1.0	1.5	1.5	2.0
Total water content of system (1)	Expansion vessel volume (litres)			
20	2.2	3.8	3.1	6.6
40	4.4	7.6	6.2	13.2
60	6.5	11.4	9.4	19.9
80	8.7	15.2	12.5	26.5
100	10.9	19.0	15.6	33.1
120	13.1	22.8	18.7	39.7
150	16.4	28.5	23.4	49.7
180	19.6	34.2	28.1	59.6
For other volumes multiply the system content by factor	0.109	0.190	0.156	0.331

1.3 SYSTEM DETAILS

Open vented heating system

Open vented system kit

The '-OV' models are only suitable for an open vented heating system and these are supplied with the following components for onsite installation.

- Feed and expansion cistern with lid
- Ball valve & float
- 22mm Overflow pipe connector
- 15mm Cold feed tank connector

F & E cistern

The feed and expansion cistern supplied with the unit, can be fitted up to 10m above the base of the appliance i.e. the maximum static pressure in the appliance must not exceed 1.0 bar (figure 2.4). The water level in the F & E cistern should be at least 250mm above the highest point on the system including the radiators.

Overflow pipe

The overflow/warning pipe should be installed using 20mm internal diameter pipe of a suitable material to comply with BS 5449 (such as copper). It should have a continuous fall and be discharged in a conspicuous external position. It should not have any other pipework directly branched into it.

Cold feed/expansion and safety/open vent

The cold feed connection is provided at the top of the appliance. The safety/open vent should be connected into the boiler flow pipe ensuring that there is a continuous rise from the boiler to the point of discharge over the F & E cistern as shown schematically in figure 2.4. The open vent and cold feed should be run in 22mm and 15mm copper (respectively) or equivalent to the feed and expansion cistern. There must no isolating valves or any such devices between the boiler and the safety/open vent connection point.

Discharge Arrangements

It is the requirement of Building Regulation Approved Document G3 that any discharge from an unvented hot water storage system is conveyed to where it is visible but will not cause danger to persons in or about the building. Therefore the discharge pipe from the appliance tundish should be fitted in accordance with the requirements and typical arrangement as shown in figure 2.5.

The discharge pipe MUST terminate in a SAFE and VISIBLE position. For a 22mm discharge it must have an equivalent length of no more than 9 metres and it must have a continuous fall (1:200 minimum) throughout its length.

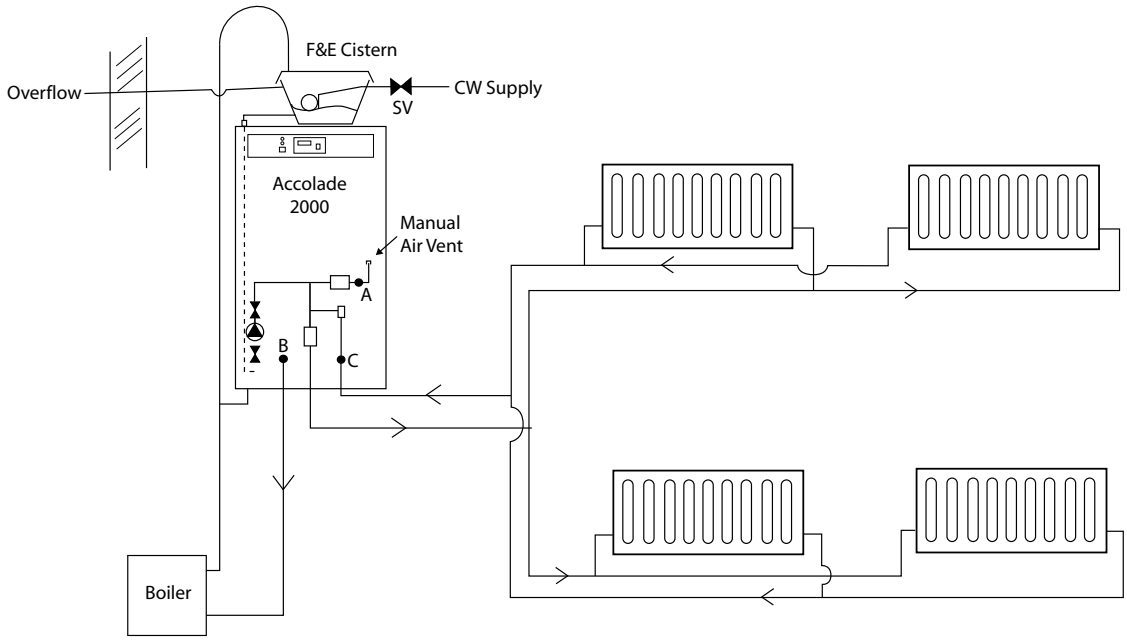


Figure 2.4 Schematic diagram of open vented heating system

1.3 SYSTEM DETAILS

In apartment/flat situations the discharge pipes can be connected into a single pipe which is discharged at low level. In this case the number should be limited to 6 to allow the fault to be easily traced. The single pipe should be at least one size larger than the largest individual discharge pipe to be connected.

The discharge can consist of scalding water and steam therefore the pipework should be metal.

The following locations for the discharge pipe are acceptable:

Low Level

- Into a gully below the grating but above the water level (see diagram 1).
- Onto the ground (drive, parth or garden area).The pipe should discharge downwards and be no more than 100mm above ground level. A wire cage should be provided to prevent people coming into contact with scalding water (see diagram 2).

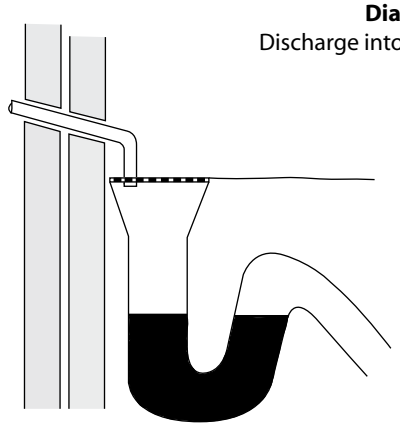
High Level

High level discharge is only acceptable if it is :

- onto a flat or pitched roof capable of withstanding high temperature water and at least 3m away from plastic guttering.
  or
- into a metal hopper and down pipe which terminates at low level (as described above.)

Discharge into a soil or waste pipe (whether plastic or metal) is not acceptable.

Diagram 1
Discharge into a gully



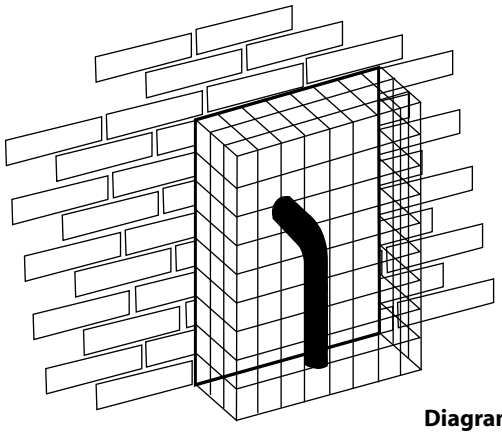


Diagram 2
Discharge onto the ground

Figure 2.5

2.1 SITE REQUIREMENTS

The appliance is designed to be installed in an airing/cylinder cupboard and the relevant minimum dimensions are provided in section 1.2 Technical Data.

Because of the ease of installation we recommend that the cupboard construction is completed and painted before installation of the appliance. The cupboard door can be fitted after installation.

If the unit needs to be stored prior to installation it should be stored upright in a dry environment and on a level base/floor.

Installation and maintenance access is needed to the front of the appliance and above the F & E cistern. See section 1.2 Technical Data for further details.

The minimum dimensions contained in section 1.2 Technical Data allow for the passage/connection of pipes to the appliance from any direction as long as the appliance is installed on the installation base provided. If the installation base is not used extra space may be needed to allow connection to the pipework and the whole of the base area should be continuously supported on a material which will not easily deteriorate if exposed to moisture.

The floor of the cupboard needs to be level and even and capable of supporting the weight of the appliance when full. Details of the weight when full is provided in section 1.2 Technical Data.

The appliance is designed to operate as quietly as practicable. However, some noise (from pumps etc) is inevitable in any heating system. This will be most noticeable in cupboards formed on bulkheads, or at the mid span of a suspended floor. In these cases the situation can be improved by placing the appliance on a suitable sound deadening material (i.e. carpet underlay or similar).

The cylinder is very well insulated and no ventilation is normally required to the cupboard.

A suitable location will be needed for the separate feed and expansion cistern (OV model) or expansion vessel (SS model). This will often be on top of the appliance itself or at high level in the cupboard housing the Accolade 2000. The dimensions and clearances are provided in section 1.2 Technical Data. The location will need to provide a suitable route for the cold feed/expansion pipe and safety/open vent pipe for the appliance (OV model) or the connecting pipe to the system expansion vessel (SS model). A suitable route and discharge position for the warning/overflow pipe and the ballvalve supply from the mains cold water system will also be required with the OV model.

An electrical supply must be available which is correctly earthed, polarized and in accordance with the latest edition of the IEE requirements for electrical Installations BS 7671.

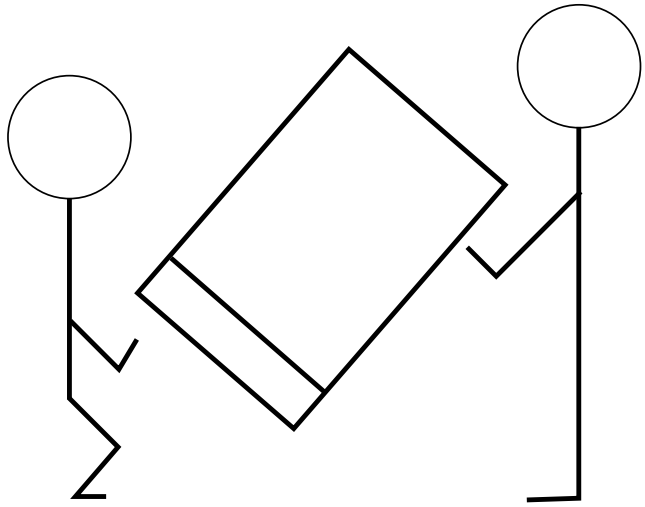
The electrical mains supply needs to be 230V/50Hz/1Ph

Connection must be made using a double-pole linked isolator with a contact separation of 3mm in both poles which is located within 1m of the appliance. The supply must only serve the appliance.

The supply to all the indirect appliances shall be fused at 16 amp.

The on and off peak supplied to all the direct models shall each be fused at 16 amp. Normally these will be provided from a suitable off peak hot water controller located adjacent to the appliance.

2.2 INSTALLATION



When lifting the unit work with someone of similar build and height if possible
Choose one person to call the signals
Lift from the hips at the same time, then raise the unit to the desired level
Move smoothly in unison
Larger units may need team lift

Preparation/placing the appliance in position

Details of the recommended positions for termination of the first fix pipework are provided in section 1.2 Technical Data. The pipework can be located or its position checked using the template provided with each appliance. If thse have been followed installation is very simple and much quicker than any other system. The appliance is supplied shrink wrapped on a timber installation base. Carrying handles are also provided in the back of the casing.

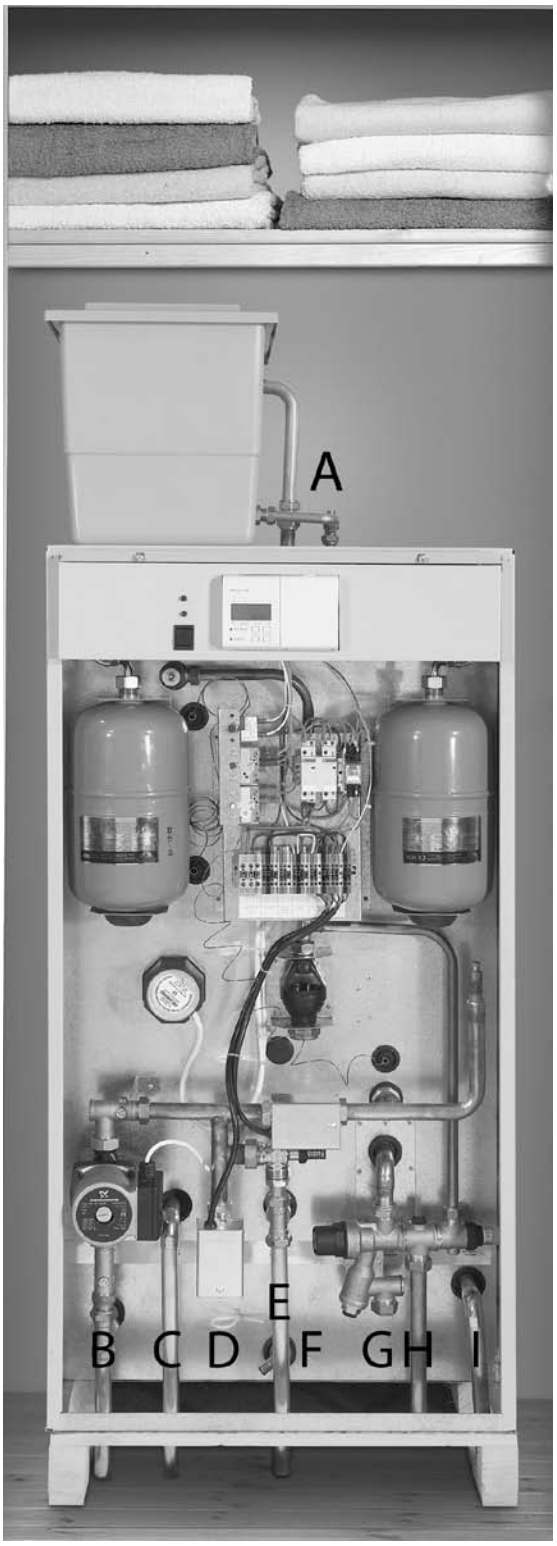
A feed and expansion cistern complete with ballvalve, cold feed/expansion and overflow/ warning fittings are provided in a separate box with the OV models. If the SS model is provided the box will contain a primary system expansion vessel. It is the installers responsibility to check that the size of cistern/ expansion vessel provided is adequate for the primary/heating system being installed. If flexible connection have been ordered these will also be inside the feed and expansion cistern/expansion vessel box.

The appliance should be handled carefully to avoid damage and the recommended method is shown opposite. Further details are provided on page 2 of these instructions. Before installation the site requirements should be checked and confirmed as acceptable. The plastic cover and protective wrapping should be removed from the appliance and the installation base (provided) placed in position.

The appliance can be then be lifted into position in the cupboard on top of the base and the front panel removed by unscrewing the 2 screws and lifting the door up and out (see opposite) ready for connection of the pipework and electrical supplies. If they are not being fitted on top of the appliance a support shall be installed for the feed and expansion cistern/expansion vessel ensuring that the base is fully supported and the working head of the boiler/system is achieved. The recommended access for maintenance must also be provided - see section 1.2 Technical Data.

Photo of Accolade with front cover open

2.2 INSTALLATION



Pipework connections

The position of the pipework connections is shown opposite . The connection sizes and dimensions are listed in Section 1.2 Technical Data.

All the connections are also labelled on the appliance. It is essential that the pipework is connected to the correct connection.

The connections can be hard piped but we recommend the use of flexible connections (available as an optional extra).

When using the psuh fit connectors with the flexible hose kits it is important to check that they are compatible. Written approval has already been obtained for :-
Hepworth - Hep$_2$O BiTite
John Guest - Speedfit
Yorkshire - Tectite

However, as similar assurances cannot be obtained for Polypipe fittings we cannot recommend their use at this time.

Connections :-

A. Safety open vent / Cold feed/expansion (OV model) / Expansion vessel pipe (SS model)
B. Primary flow (from boiler)
C. Primary return (to boiler)
D. Central heating flow
E. Central heating return
F. Drain (valve is not provided with the appliance)
G. Incoming mains water
H. Balanced pressure cold outlet
I. Domestic hot water

Note: With the OV model the safety open vent and cold feed/expansion should be combined before connecting to the appliance.

2.2 INSTALLATION

All factory made joints should be checked after installation in case they have been loosened during transit.

OV Model
The fittings for the feed and expansion cistern should be installed and the cistern fitted on top of the appliance/on its supports.

The 22mm safety/open vent shall rise continuously from the boiler and terminate in the F & E Cistern.

The 15mm cold feed/expansion shall be connected from the F & E Cistern to the connection provided on the top of the appliance.

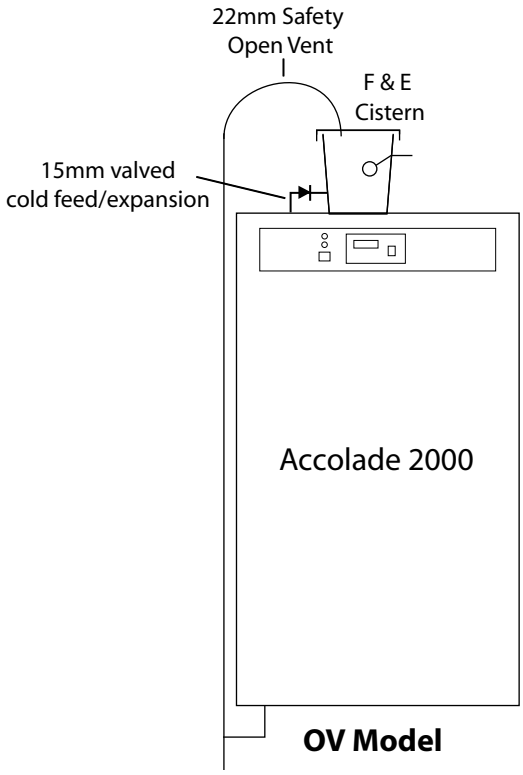
No valves should be fitted in the safety open vent which must be a minimum of 22mm copper pipe or equivalent.

The overflow/warning pipe shall have a continuous fall, be fitted to discharge clear of the building and be sited so that any overflow can be easily observed. It shall also be installed in a size and material suitable for use with heating feed and expansion cisterns in accordance with BS 5449 and should not have any other connections to it.

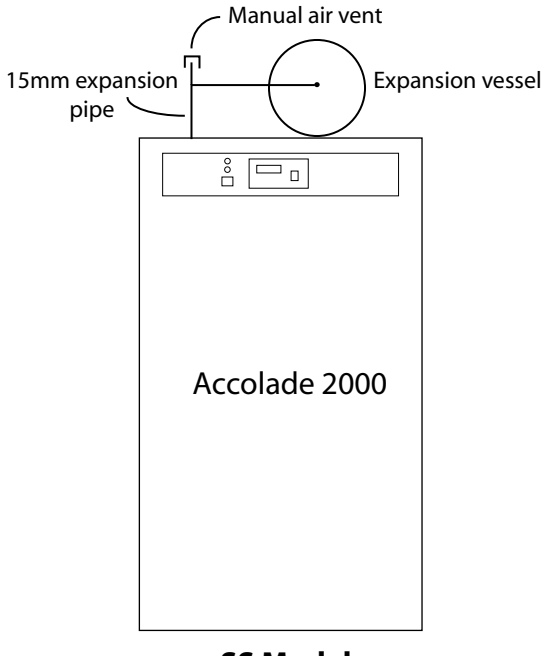
SS Model
The expansion vesel should be fitted on top of the appliance/supports provided and connected to the appliance using a manual air vent at the high point.

It is normally envisaged that the feed and expansion cistern/expansion vessel will be located in the same cupboard as the Accolade 2000 appliance. In the case of the OV model this will allow a dry roof space.

However, if it is necessary to locate the cistern in the roof space any pipework in the roof space and the feed and expansion cistern will need to be adequately insulated to protect against frost damage.

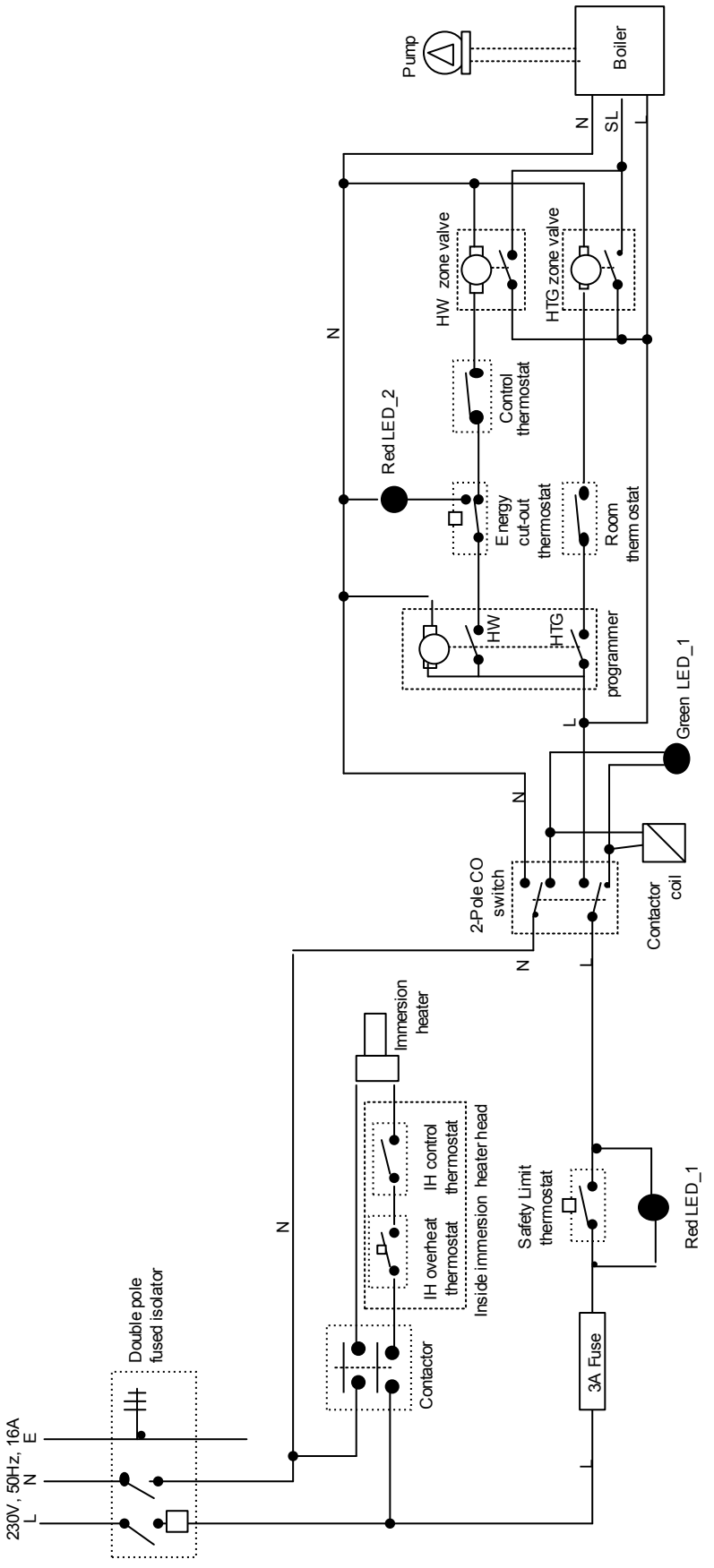


OV Model



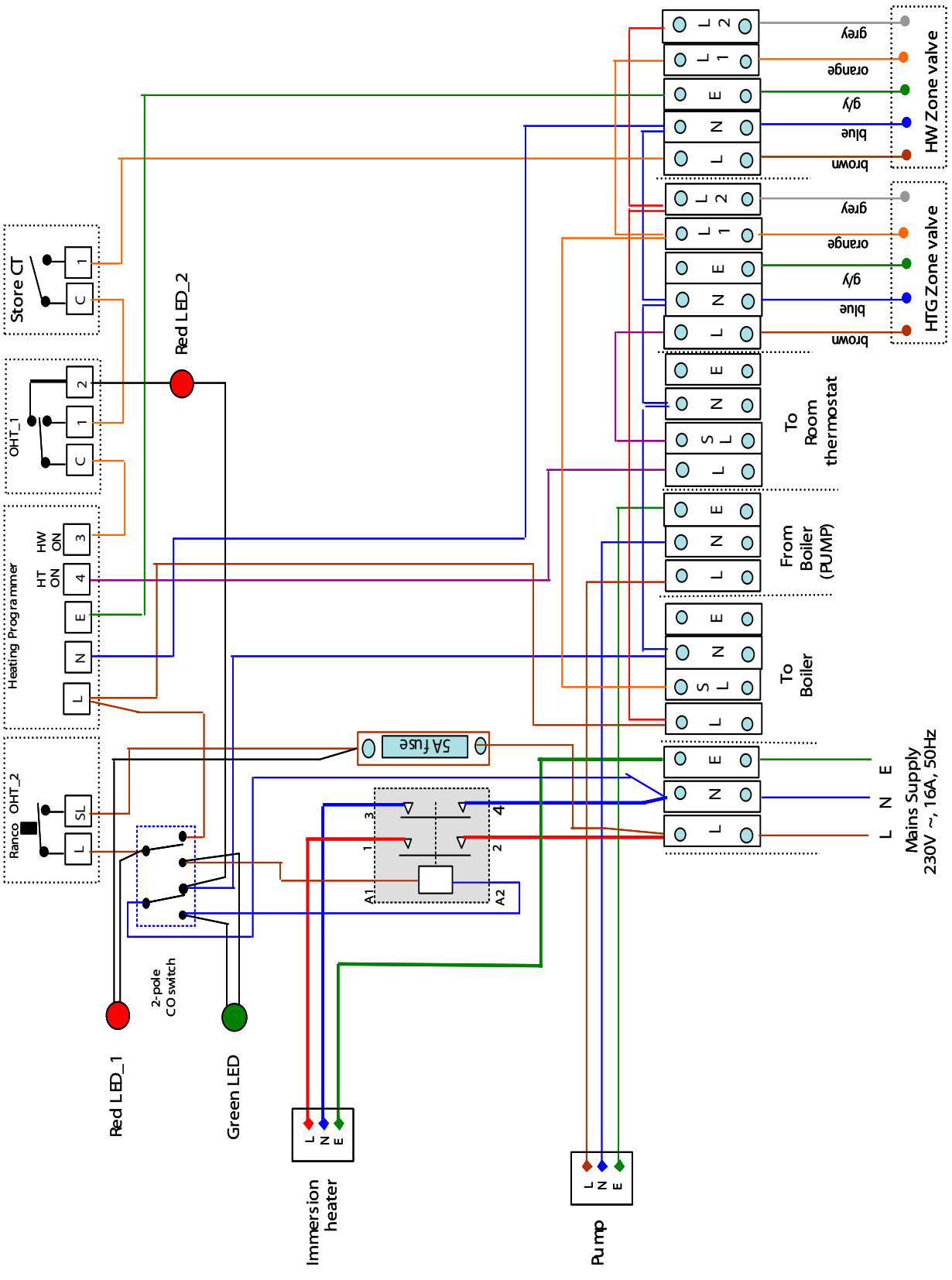
SS Model

2.2 INSTALLATION



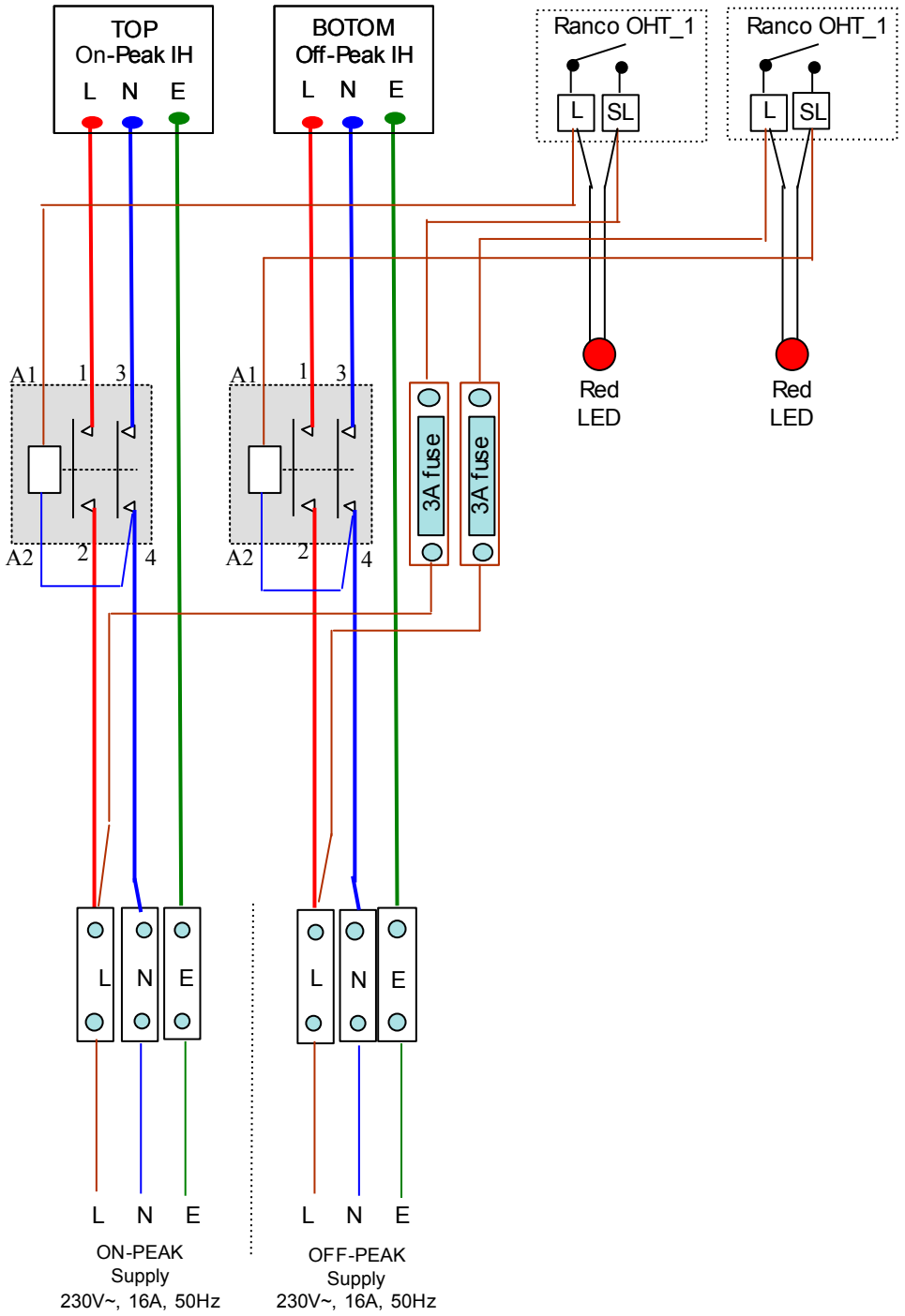
Typical diagrammatic arrangement of the electrical wiring for the indirect model

2.2 INSTALLATION



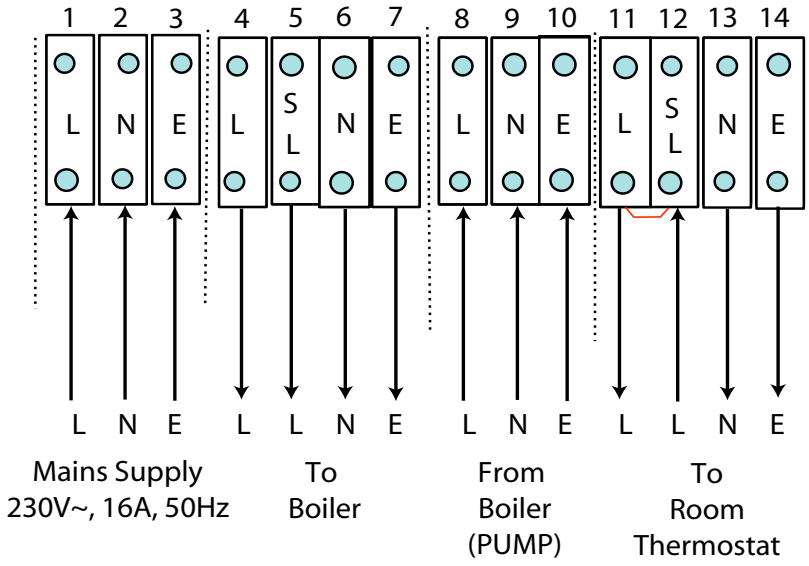
2.2 INSTALLATION

Schematic wiring diagram of Direct Accolade2000 (Ver: 260603)

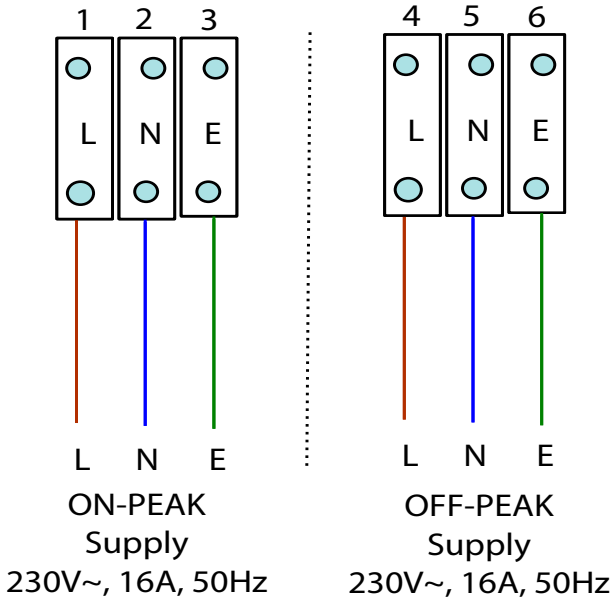


Wiring Diagram - Direct Model

2.2 INSTALLATION



Note: Link between 11 and 12 to be removed if a room thermostat is fitted



Electrical Connection - Indirect Appliance

The Accolade 2000 is pre-wired to a 24 way terminal strip and plumbers are well able to complete the electrical installation provided they adhere strictly to the IEE Requirements for Electrical Installations BS 7671. A schematic arrangement of the wiring is shown opposite.

Terminals 1 - 14 should be wired on site in accordance with the diagram opposite. Terminals 15 - 24 are pre-wired to components fitted on the appliance.

All the terminals are suitably labelled on the appliance.

Note: Do not attempt the electrical work unless you are competent to carry it out to the above standards.

Before commencing check that the power source is in accordance with section 1.2 Site Requirements and ensure that it is isolated.

The boiler manufacturers wiring instructions should be read in conjunction with this manual.

Run the external wiring through the service slot provided in the base of the appliance.

Make the connections as shown opposite on the terminal strip provided.

The appliance is provided with a link between terminals 11 and 12 on the terminal strip. This must be removed if a room thermostat is fitted.

Electrical Connection - Direct Appliance

The Accolade 2000 is pre-wired to 2 x 3 way terminal strip and plumbers are well able to complete the electrical installation provided they adhere strictly to the IEE Requirements for Electrical Installations BS 7671. A schematic arrangement of the wiring is shown opposite.

Both sets of terminals shall be wired on site from a suitable off peak hot water controller.

All the terminals are suitably labelled.

Note: Do not attempt the electrical work unless you are competent to carry it out to the above standards.

2.2 INSTALLATION

Before commencing the electrical work check that the power source is in accordance with section 1.2 Site Requirements and ensure that it is isolated.

When installing the indirect unit the boiler manufacturers wiring instructions should be read in conjunction with this manual.

Run the external wiring through the service slot provided in the base of the appliance.

Make the connections as shown opposite on the terminal strip provided.

Before switching on the electrical supply check all the factory made terminal connections to ensure they have not become loose during transit and that the appliance is full of water.

Frost Protection

When frost protection is required for the whole house set the programmer to constant during the time required and adjust the room thermostat to a suitable setting.

SYSTEM FILLING/CLEANSING

Check and adjust as necessary the hot water system expansion vessel(s) air pressure to 1.5 bar.

Check that any drain valves are closed then open the incoming stop valve and fill the domestic mains cold and hot water systems in the normal way ensuring there is no air trapped in the system.

In the case of the OV model fill the heating system with potable water through the feed and expansion cistern flush and refill.

Check the water level in the feed and expansion cistern and adjust the ballvalve if necessary.

Check the warning pipe is installed correctly, has a continuous fall and is not blocked i.e. discharges water freely.

Check and adjust as necessary the primary heating system expansion vessel to the figure specified (normally 1.0 bar)
Note: The expansion vessel pressures should be checked before the systems are filled.

In the case of the SS model fill the primary heating system with potable water through the filling loop provided adjacent to the boiler to the pressure required (normally 1.0 bar).

During filling vent air as necessary from the high points of the system including the manual air vents provided on the appliance and on the feed to the expansion vessel.

Check the whole of the primary heating and domestic hot and cold distribution systems for leaks.

It is essential that all systems functions properly for optimum performance.

To achieve this, the primary system should be commissioned in accordance with good practice and generally in accordance with the requirements of BS 6798, BS 5449 and BS 7593.

Full details of the requirements are given in PAS 33:1999 under Section 10 Commissioning.

When using either cleansing or corrosion inhibitor chemical, the manufacturers instructions must be followed.

Cleansing the Primary System

It is very important to ensure that the Primary system is cleaned using a suitable cleansing agent such as Sentinel X300 or Fernox Superfloc to ensure that any flux residues/installation debris are removed.

The volumes/concentration should be calculated in accordance with the manufacturers instructions allowing the volume for the primary coil shown in the Table in 1.2 Technical Data.

Primary Water System Treatment

Although the Accolade 2000 has no special water treatment requirements, the radiators and other parts of the circuit will benefit from the application of a scale and corrosion inhibitor such as Sentinel X100 or a Protector such as Fernox MB1.

The volumes/concentration should be calculated in accordance with the manufacturers instructions allowing the volume for the primary coil shown in the Table in 1.2 Technical Data.

2.3 COMMISSIONING

POWERFLUSHING/CLEANING OF THE HEATING SYSTEM

If it is proposed to 'powerflush' the heating system always check and comply fully with the manufacturers instructions for the powerflushing equipment being used.

If in any doubt please consult our Technical Helpline.

Cleansing the Hot/Cold Water System Treatment

Fully flush and, when necessary, chlorinate the hot and cold water system in accordance with the recommendations in the Model Water Byelaws and BS 6700.

Remove and clean the strainer element in the combination inlet valve, then replace it and re-fill the system.

Manually open the relief valves one by one and check that water is discharged and runs freely through the tundish and out at the discharge point. The pipework should accept full bore discharge without overflowing at the tundish, and the valve should seat satisfactorily.

With the OV model once the system is finally filled turn down the servicing valve for the ballvalve in the F & E Cistern to the point where the warning/overflow will cope with the discharge arising from a ballvalve failure.

With the SS model disconnect the manual filling loop.

2.3 COMMISSIONING

Appliance Commissioning

Indirect Models

Check temperature settings are set at 60ºC. Turn on and check that thermostats and all controls operate correctly as well as any motorised valves. Check that no water discharges from either the expansion valve or temperature and pressure-relief valve during the heating cycle. Check the temperature setting on the immersion heater is set at 60ºC. Turn on and check it operates and switches off at the correct temperature. Check the appliance, the heating system and hot water system for leaks when hot.

Direct Models

Check temperature settings on the immersion are set at 60ºC. Turn on and check thermostat operates and switches off at the correct temperature. Ensure no water discharges from either the expansion valve or temperature and pressure relief valve during the heating cycle.

System Commissioning

Check that the correct outlet pressure is being maintained on the domestic water systems by the pressure reducing valve by checking the pressure at a hot tap or in the tapping provided on the combination inlet valve.

Check the correct flow is being achieved at each tap and the implications of opening more than one tap at the same time. If necessary fit flow regulators to each tap.

The heating system is set to operate as a standard 'S' plan and the pump and primary system should be set and balanced in the normal way to provide a temperature differential of 11ºC.

An automatic bypass valve is provided on the primary/heating circuit. This is factory set to 2m head but may need to be adjusted to suit the particular installation requirements.

The clock/programmer provided on the appliance controls the heating and hot water systems separately and should be set to suit the householders requirements using the instructions shown on the separate leaflet and the label on the right hand drop down part of the programmer.

This product is covered by the 'Benchmark' scheme and a separate commissioning/ service log book is included with this product. This must be completed during commissioning and left with the product to meet the Warranty conditions offered by Gledhill.

On completion:-

1. Do ensure that the electrical connections (e.g. mains supply, room thermostat) to the unit are correct and tight.
2. Do ensure that the functioning and control of the system is explained to the occupant and explain the need and importance of periodic servicing.
3. **DON'T** place any clothing or other combustible materials against or on top of this appliance

These Instructions should be placed along with the component manufacturers instructions in the pocket provided on the rear of the front panel. The front panel should then be refitted.

NOTE:- With sealed heating systems air is released from the water during the first few weeks of operation. This must be vented and the system repressurized.

2.3 COMMISSIONING

If the system is not likely to be used continuously after testing/commissioning it should be isolated from the water and electricity supply and either drained down or have the pressure removed from both the heating and water systems.

Important Do's and Don'ts

DO check the incoming mains water pressure and flow rate are adequate. (The preferred range of mains pressure is 2-3bar).

DO check and ensure that the air pressure side of the hot water exapnsion vessel(s) is set at 1.5 bar.

DO check that all plumbing and electrical connections are in accordance with the labelling on the unvented storage appliance.

DO insulate any exposed pipework in the Accolade 2000 cupboard.

DO plumb the overflow/warning pipe (if fitted) in a 20mm internal diameter pipe material which is suitable for use with a heating F & E cistern, in accordance with BS 5449 (such as copper) and ensure it has a continuous fall and discharges in a conspicuous external position.

DO check the pump setting to give a temperature difference across the flow and return of not more than 11°C.

DO ensure that the bypass valve is set correctly.

DON'T use pipe smaller than 28mm between the boiler and the Accolade when the boiler rating exceeds 20kW (about 68,000 Btu/h).

DON'T operate any immersion heaters until the appliance/systems are fully fitted, vented and commissioned.

SS Models

DO check and ensure the air pressure side of the heating expansion vessel is set at 1.0 bar (or as specified)

DO ensure the boiler is suitable (i.e. fitted with an overheat thermostat)

OV Models

DO adjust the ballvalve so that the water level in the appliance F & E cistern when the system is cold is correct and does not overflow when the appliance is at maximum temperature

DO turn down the servicing valve for the ballvalve in the F & E cistern, once the system is finally filled, to the point where the warning/overflow pipe will cope with the discharge arising from a ballvalve failure.

DO make sure that there is adequate clearance above the appliance F & E cistern to service the ballvalve.

3.1 ANNUAL SERVICING

SERVICING/MAINTENANCE

The Registered Installer is responsible for the safe installation and operation of the system. He must also make his customer aware that periodic checks of the equipment are required by the Building Regulations and essential for safety.

Maintenance and inspection periods will vary for many reasons. Gledhill Water Storage Ltd recommend a maximum of 12 months between inspections to coincide with boiler maintenance. Experience of local water conditions may indicate that more frequent inspection is desirable, eg. when water is particularly hard, scale-forming or where the water supply contains a high proportion of solids, eg. sand. For Maintenance see the table opposite:

1	With the water supply turned off, remove the screen from the strainer in the combination inlet valve and clean off any detritus (dirt)
2	With the water supply turned off and the hot taps open, check the expansion vessel charge pressure and top up as necessary (1.5 bar)
3	With the water supply turned on, open the temperature relief valve and then expansion valve to check for unrestricted discharge into tundish. Check valves for freedom of movement and confirm that the water stops and both valves reseat correctly. Check at a full bore discharge from either valve that there is no back up and disharges over the tundish
4	Check that the correct outlet pressure is being maintained by the pressure reducing valve by recording the pressure at a terminal fitting on the tapping provided on the combination inlet valve.
5	Clean flow regulators (or restrictor/aerators) as applicable. Check for correct flow rate at terminal fititngs
6	Visually inspect, checking for the presence of supplementary bonding and that it is being maintained
7	Check correct rating and type of fuse is fitted on the electrical supply
8	Check for the correct operation and temperature setting of the thermostats
9	Check the operation of the motorised valves
10	If necessary descale the heat exchangers in hard water areas

3.2 CHANGING COMPONENTS

The KIWA Approvals for the Accolade 2000 appliance are conditional on the specific manufacturer/type of components fitted and any replacements must be purchased direct from Gledhill to ensure compatibility/ continued safe operation.

Free of charge replacements for any faulty components are available from Gledhill during the in-warranty period (normally 12 months).

However, if any component is damaged during installation a new replacement must be ordered and paid for.

After this, spares can be obtained direct from Gledhill using the 'Speed Spares' service, or through any of the larger plumbers merchants/ specialist heating spares suppliers.

Help and advice is also available from the Technical Helpline on 08449 310000.

However, all components are readily accessible and can be changed quickly and easily by the installer using common plumbing practice.

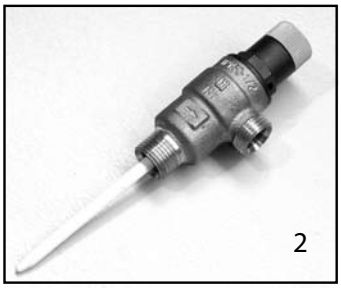
If it is necessary to replace any of the pumps fitted to the appliance the pump head (motor pack) only should be removed as recommended by Grundfos. Assuming it is within warranty this will be accepted by a merchant as being covered by the Grundfos national service exchange agreement, as long as it is a complete pump i.e. alleged faulty motor pack and new base is left with the merchant. It is important when a pump has been replaced to ensure that any air is adequately vented.

3.3 SHORT PARTS LIST

Key No.	Description	Manufacturer	Stock Code No.	Gas Council Part No.
1	Inlet Control Group ICS	Honeywell		
2	P & T Valve TP152 4.0 bar and 90°C	Honeywell		
3	Tundish			
4	Control/High Limit Thermostat	Honeywell		
5	Control Thermost	Honeywell		
6	Store OHT 1	Honeywell		
7	Store OHT 2			
8	Hot Water Zone Valve 22mm V4043 with removable head	Honeywell		
9	Hot Water Zone Valve 28mm V4043 with removable head	Honeywell		
10	Automatic By-pass Valve	Comap		
11	Anti Vacuum Valve		GT056	
12	Expansion Vessel HYDRO-PRO-PRO Circular (5 litre)	Zilmet		
13	Pump UPS 15-50 (22mm connections)	Grundfos		
14	Pump UPS 15-60 (28mm connections)	Grundfos		
15	Pump Valve (Straight)			
16	Pump Valve (Angle)			
17	Immersion Heater	Redring		
18	Contactor	Telemecanique		
19	Panel Switch			
20	Primary Expansion Vessel	Zilmet		
21	Primary Expansion Relief Valve and Pressure Gauge			

3.3 SHORT PARTS LIST


1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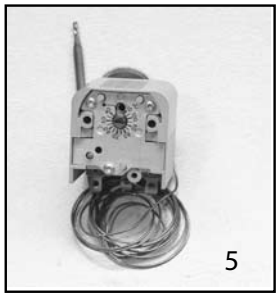
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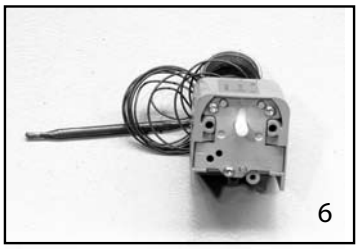
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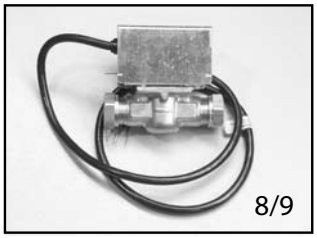
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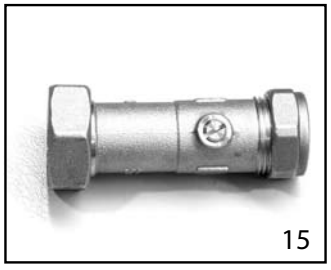
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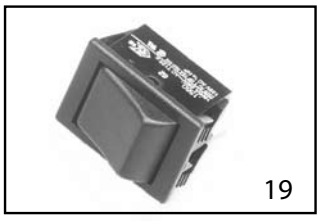
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21

3.4 FAULT FINDING

SCALE

In hard water areas, above 200ppm (mg/l) it is recommended that an in-line scale inhibitor is fitted. Reducing the temperature of the stored water will reduce the rate at which scale forms. If the recovery rate is badly affected, this is an indication that scaling may have occurred. In this event, follow the procedures as recommended by a reputable Water Treatment Company.

GENERAL

All work must be carried out by a suitably qualified/competent person.

No hot water at the taps
Check that the mains water supply is turned ON. Check the line strainer in the combination inlet valve is not blocked. Check that the combination valve has been fitted so that water is flowing in the correct direction.

If the water at the tap is cold
Ensure that the boiler/immersion heater(s) have been switched ON and are working correctly. **Note**: in the case of the direct units check the hot water controller/off peak supply is working correctly. Check that there are no air locks in the primary system. ISOLATE THE UNIT AT THE MAINS ELECTRIC SUPPLY AND THEN CHECK THE FOLLOWING:-

i) The cylinder thermostat
ii) The thermal cut-out, which can be re-set by pushing the red button.
iii) The motorised valve
iv) The boiler thermostat
v) The boiler thermostat cut-out

If the boiler is for any reason unable to supply heat to the appliance, hot water can be obtained by operating the rocker switch on the front of the appliance to switch on the immersion heater.

ANY ENERGY CUT-OUT MUST NEVER BE BY-PASSED UNDER ANY CIRCUMSTANCES.
If the units are not getting hot and the heat source is electrical, ensure that the immersion heaters are isolated from the mains before re-setting the energy cut-out. If the immersion heater(s) need replacing this should be done with the unit supplied from Gledhill Water Storage Ltd. Same day despatch to approved installers can be arranged by telephoning 01253 474444.

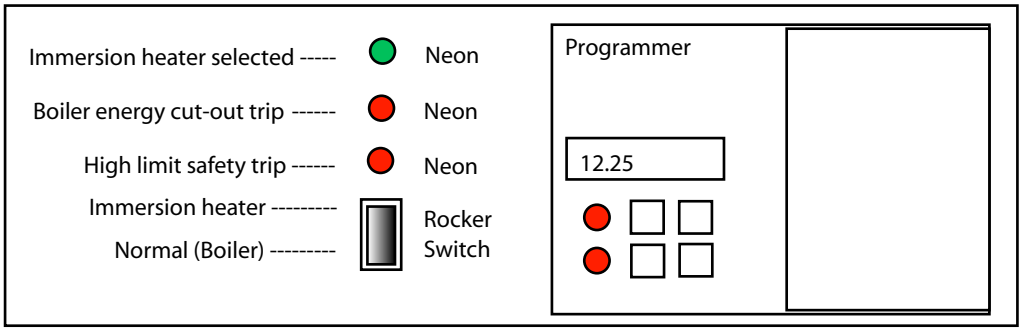
DISCHARGE FROM RELIEF VALVES

If cold water is discharging from the expansion relief valve drop the system pressure and check the air pressure in the expansion vessel is 1.5 bar.

If the fault continues and the problem cannot be stopped by operating the easing control a few times then either the Pressure Reducing Valve or the Relief Valve may be at fault. If the cold water pressure is too high, this would suggest that the Pressure Reducing Valve is at fault and the Gledhill approved replacement should be fitted. If the pressure is correct then the Relief Valve/cartridge will require replacing with a Gledhill approved component.

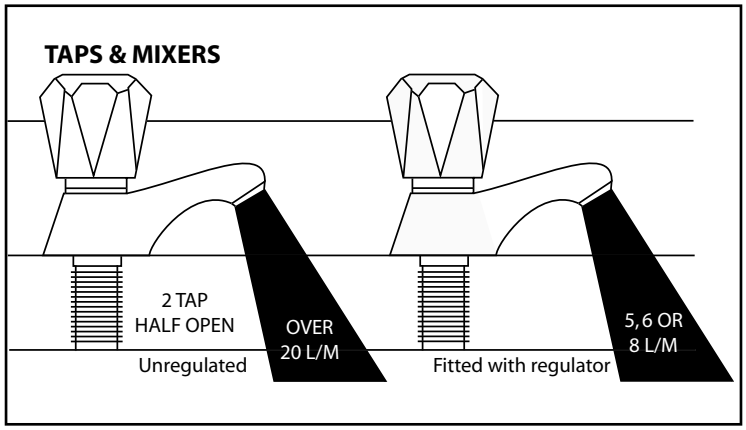
If there is an overheat fault and very hot water is being discharged, turn off the heat source, but not the water supply. When the system is cool, check thermostats and energy cut-outs in the boiler and immersion heaters and replace the faulty component with a unit supplied by Gledhill and check that it works correctly before returning the system to full operation.

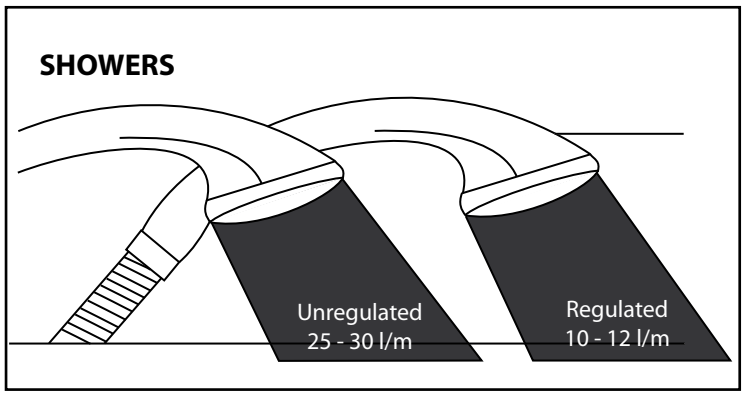
Note: The controls on the front of the indirect unit (see below) will indicate the operating condition of the appliance and whether either of the two safety thermostats have tripped.



WATER SAVINGS

WATER RELATED COSTS CAN BE REDUCED BY GOOD PLUMBING PRACTICE.

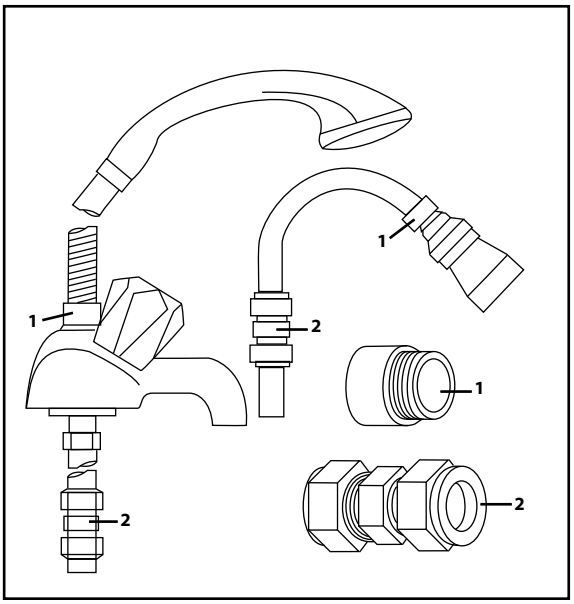




Vast quantities of water are needlessly run off to waste due to Taps, Mixers and Showers discharging flow rates far in excess of the rates required for them to perform their duties.
The contrasting flow rates shown on this leaflet clearly illustrate the savings that can be made whilst still providing a good performance.
British made Aquaflow Regulators provide constant flow rates by automatically compensating for supply pressure changes between 1 bar & 10 bars.
To facilitate installation into the wide range of plumbing equipment which is encountered in the U.K, Four Fixing Options are available:-

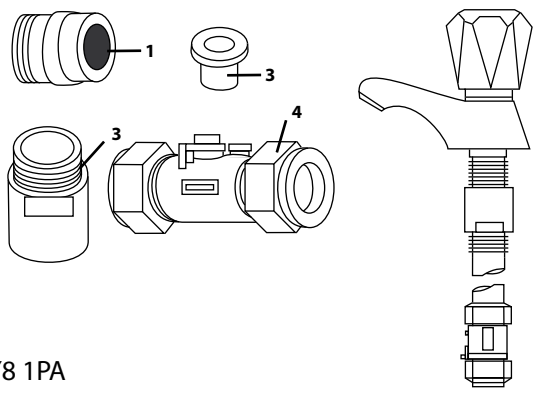
OPTIONS FOR SHOWERS

1. MXF "DW" Range - For fitting behind Fixed Shower Heads or onto Flexible Hoses for Handshowers (preferably onto the inlet end when lightweight hoses are used).
2. Compression Fitting Range. "In Line" regulators as in Option 4 for Taps & Mixers.



4 FIXING OPTIONS FOR TAPS & MIXERS

1. MK Range - Combined Regulators & Aerator for screwing onto Taps & Mixers with internal or external threads on their noses. Anti Vandal models also available.
2. MR05-T Range - Internal Regulators. Push-fit into Tap or Mixer seats. Produced in three sizes - 12.5mm (BS1010), 12mm & 10mm, Flangeless models also available for Taps with Low Lift washers.
3. MXF Standard Range - Screw on tail models for Taps & Mixers. Fix onto the tails before fitting the tap connectors. Available in 3/8", 1/2", 3/4" and 1" BSP.
4. Compression Fitting Range - "In Line" regulators housed in 15mm & 22mm CXC Couplers & Isolating Valves. "💧" UK WFBS listed by the Water Research Centre. Isolation valves available for slotted screwdriver operation or with coloured plastic handles. Now available also in plastic bodied push-fit couplers & valves.



Information by courtesy of

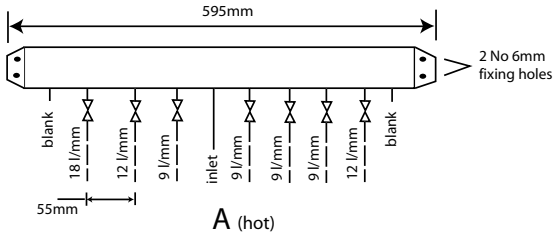
AQUAFLOW REGULATORS LTD

Haywood House, 40 New Road, Stourbridge, West Midlands DY8 1PA
TELEPHONE (01384) 442611 FAX: (01384) 442612

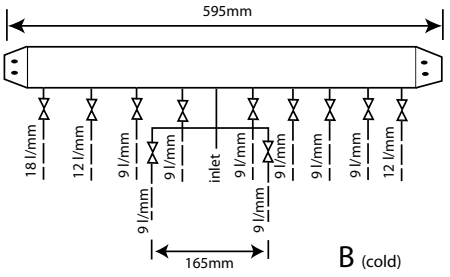
MANIFOLDS

Manifold type: 1 - Stock Code MIP 050 (one bathroom, one en suite shower room, one cloakroom, one kitchen)			
Flow regulator (litres/minutes)	Terminal fitting	Hot water manifold outlets Quantity	Cold water manifold outlets Quantity
18	Bath tap	1	1
9	Hand basin	3	3
12	Kitchen sink	1	1
9	Toilet cistern	None	3
9	Shower	1	1
12	Washing machine	1	1
9	Dishwasher	None	1
	Total	7	11

Two sets of manifolds are available as an optional extra. Each set comprises a separate hot and cold water manifold. Both are provided with a 22mm inlet connection located centrally. All outlet connections are 15mm compression. The centre to centre dimension of each branch is 55mm.



A (hot)

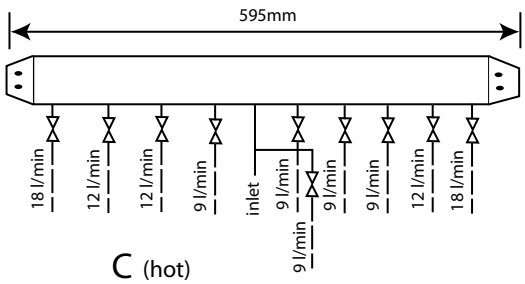


B (cold)

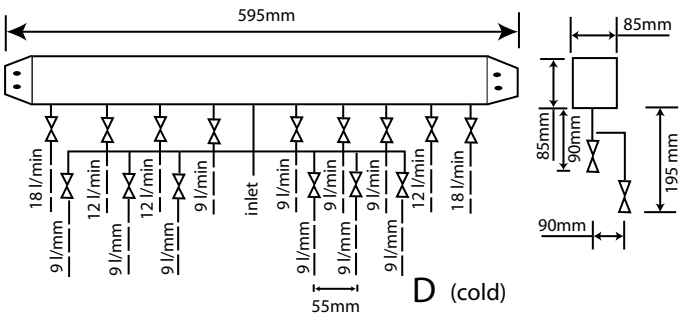
Manifold type: 2- Stock Code MIP 060 (two bathrooms, one en suite shower room, one cloakroom, one kitchen, one utility room)			
Flow regulator (litres/minutes)	Terminal fitting	Hot water manifold outlets Quantity	Cold water manifold outlets Quantity
18	Bath tap	2	2
9	Hand basin	4	4
12	Kitchen sink	2	2
9	Toilet cistern	None	4
9	Shower	1	1
12	Washing machine	1	1
9	Dishwasher	None	1
	Total	10	15

The arrangement of each manifold is supplied as shown. This provides the best balance of flows but the flow regulators/duty of each branch can be changed if required as long as a reasonable balance is maintained. If it is necessary to change or clean the flow regulator this can be done without needing to drain the system by closing the valve and removing the screwed cover below the white plastic cover.

The manifolds are designed to be used with plastic pipework and are supplied complete with isolation valves and flow regulators on each branch. They would normally be installed in the same cupboard as the thermal storage appliance (as shown below) but can be installed in another cupboard close to the appliance if required.



C (hot)



D (cold)

APPENDIX B

An optional location where cupboard space is tight

The preferred solution where space will allow

The pressure loss through a flow regulator at the designated flow rate is about 1.8 bar. Therefore for the flow regulator to control the flow rate at pre-set level, the inlet pressure must be greater than 1.8 bar. If the inlet pressure is lower, the flow rate will be correspondingly less than the pre-set values.

The maximum equivalent pipe lengths from the manifold to the terminal fittings can be estimated from the above information and the resistance characteristics of the pipes. The examples presented below are for 15mm copper pipe in table 1 and for plastic pipework in table 2.

Table 1: Maximum equivalent pipe length in 15mm copper			
Inlet pressure (bar)	Maximum equivalent length of pipe (m)		
	@ 9 l/m	@ 12 l/m	@ 18 l/m
2.0	25	10	5
2.5	75	30	15
3.0	150	60	30

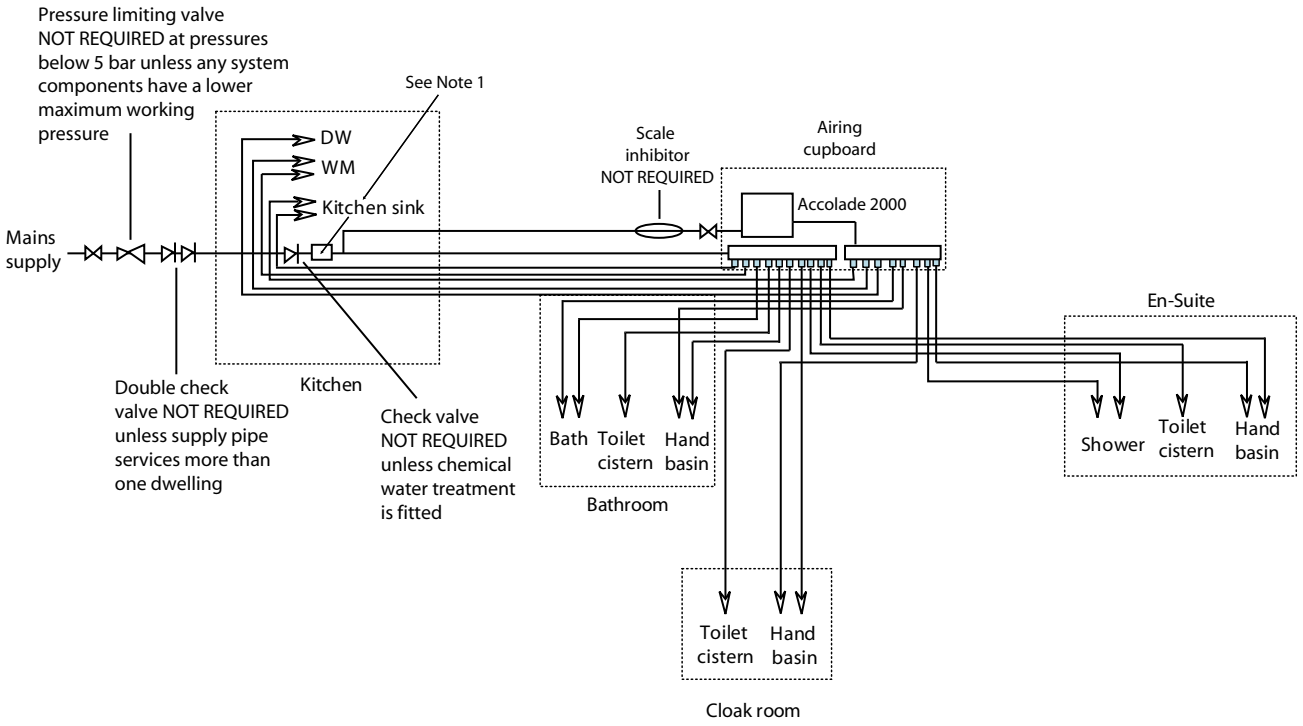
Table 2: Maximum equivalent pipe length in plastic pipe			
Inlet pressure (bar)	Maximum equivalent length of pipe (m)		
	@ 9 l/m	@ 12 l/m	@ 18 l/m
2.0	1.5	15mm : 10	15mm : 4.5 22mm : 40
2.5	3.0	15mm : 20	15mm : 9.0 22mm : 80.0
3.0	4.5	15mm : 30	15mm 13.5 22mm : 120

APPENDIX B

The size of the distribution pipes supplying the manifold should be calculated using the method set out in BS 6700. A typical diagrammatic arrangement of a system using Manifold Type 1 is shown below. This is only meant to show the principles involved and the actual connection of fittings to the manifold will need to suit the arrangements shown on page 35.

Note 1 - If it is proposed to fit chemical water treatment such as a water softener this should be fitted in this location and the cold water branch in the sink should be branched off the cold water main prior to the treatment device instead of the cold water manifold.

Any other isolating/control valves and backflow protection devices should be provided as necessary to comply with the Water Regulations.



Gledhill (Water Storage) Ltd

AMD. JUNE 2008

CONDITIONS OF SALE & GUARANTEE TERMS

1. Gledhill (Water Storage) Ltd ("We" or "Gledhills") only do business upon the Conditions which appear below and no other. Unless we so agree in writing these Conditions shall apply in full to any supply of goods by us to the exclusion of any Conditions or terms sought to be imposed by any purchaser. These Conditions of Sale and Warranty Terms override those which are contained on the Invoice Forms and all Sales are now subject to these Conditions of Sale and Warranty terms only.

2. PRICE

Once an order or call off has been accepted the price will be held for three months **but if delivery is extended beyond that period at the customer's request, then we reserve the right to amend the price when necessary.** The company reviews its pricing annually to adjust for changes in our cost base. We reserve the right to alter prices at any time for severe movements in raw materials (mainly copper and steel). If there is to be a change we will give customers at least four weeks notice but anything delivered after that date will be at the revised price. An order may not be cancelled or varied after acceptance without the written consent of the company. Such cancellation or variation shall be subject to such reasonable charges as may be appropriate.

3. SPECIFICATION

The goods are supplied in accordance with the Specifications (if any) submitted to the Purchaser and any additions and alterations shall be the subject of an extra charge. Any goods not so specified shall be in accordance with our printed literature or the literature of any of our component suppliers (subject to any modifications made since publication). If we adopt any changes in construction or design of the goods, or in the specification printed in our literature, the Purchaser shall accept the goods so changed in fulfilment of the order.

4. PAYMENT

The invoice price of goods shall be payable within 30 days of despatch by us of our invoice for the goods or such longer time as may be stated by our quotation or invoice. If we receive payment in full on or before the due date we will allow an appropriate settlement discount except where we have quoted a special net price. If payment is not received in full on or before the due date we shall be entitled in addition to the invoice price to:

(i) payment of a sum equal to any increase in the copper price supplement applicable to the particular goods sold between the date of receipt of order and the date of receipt of payment in full; and

(ii) interest on any part of the invoice price unpaid after the due date at the rate of 3% per annum over the base rate for the time being of HSBC Bank plc.

5. TIME

We give estimates of delivery dates in good faith and time of delivery is not nor shall be made of the essence of any contract nor shall we be liable for any loss or damage occasioned by delay in delivery.

6. DELIVERY

We deliver free normally by our own vehicles within 25 miles of any of our manufacturing depots. Delivery to any place more than 25 miles from one of our manufacturing depots may be subject to our quoted delivery charges. We reserve the right to make delivery of goods contained in one order by more than one consignment and at different times. Where a period is agreed for delivery and such period is not extended by our Agreement, the Purchaser shall take delivery within that period. If the Purchaser fails to take delivery, we shall be entitled at the Purchaser's risk and expense to store the goods at the Purchaser's premises or elsewhere and to demand payment as if they had been despatched. Off loading at point of delivery shall be the responsibility of and be undertaken by the Purchaser.

7. SHORTAGES OR DAMAGE

Goods must be inspected before signature of delivery note and any damage, shortage or discrepancy noted on the delivery note and the goods returned on the same vehicle. The buyer must also give us immediate written notice of the damage, shortage or discrepancy so that we may prompt investigation.

8. RETURN OF GOODS

Goods may not be returned to the Company except by prior written permission of an authorised officer of the Company and such return shall be subject to payment by the Purchaser of handling and re-stocking charges, transport and all other costs incurred by the Company.

9. COMPANY LIABILITY AND GUARANTEE

9.1. Subject to the terms of these Conditions of Sale and Guarantee Terms Gledhills provide Guarantees in respect of specific products as set out in this clause.

9.2. Each Guarantee is strictly conditional upon the following:-

9.2.1. Complaints must be given to us immediately, before any action is taken, as responsibility cannot be accepted if repairs or renewals are attempted on site without our written approval.

9.2.2. The unit has been installed in accordance with our installation and service instructions and all relevant codes of practice and regulations in force at the time of installation.

9.2.3. All necessary inlet controls and safety valves have been fitted correctly.

9.2.4. The unit has only been used for the storage of potable water supplied from the public mains.

9.2.5 Where appropriate the unit has been regularly maintained as detailed in the installation and service instructions

9.2.6. Defects caused by corrosion or scale deposits are not covered by any Guarantee.

9.2.7. Where we agree to rectify any defect we reserve the right to undertake the work on our own premises.

9.3. Guarantees are provided in respect of specified goods supplied by Gledhills as follows:-

(a) Domestic and Commercial Open Vented Cylinders and Tanks.

The copper storage vessel is guaranteed for ten years and if it proves to be defective either in materials or workmanship, we will either repair or supply replacement at our option with the closest substitute in the case of any obsolete product to any address in Great Britain.

(i) free of all charge during the first year after delivery by us.

(ii) thereafter at a charge of one-tenth of the then current list price and any copper price supplement and delivery charge during the second year after delivery by us and increasing by a further one-tenth on the second and subsequent anniversary of delivery by us.

(b) Domestic Mains Fed Products [Primary Stores]

The copper storage vessel is guaranteed for five years and if it or any integral pipework as part of the storage vessel assembly proves to be defective either in materials or workmanship, we reserve the right to either repair or supply replacements or the closest possible substitute in the case of any obsolete product and will collect and deliver to any address in England, Wales and Scotland (excluding all Scottish Islands).

(i) free of all charge during the first year after delivery by us.

(ii) thereafter at a charge of one-fifth of the then current list price or any copper price supplement and delivery charge during the second year after delivery by us increasing by a further one-fifth on the second and subsequent anniversary of delivery by us.

(c) Integrated Boiler and Storage Vessel Products and Stand Alone Boilers

In the case of the GulfStream range of products and the Gledhill boiler range of products, Gledhill guarantees the heat exchanger (boiler) for material and construction faults for two years. THE RESPONSIBILITY FOR THE EXECUTION OF THIS GUARANTEE LIES WITH THE INSTALLER.

The guarantee becomes null and void if the appliance is used incorrectly, or in the event of proven negligence or incorrectly implemented repairs **OR FAILURE TO CARRY OUT THE RECOMMENDED INSPECTION/ MAINTENANCE**. The guarantee also becomes null and void if changes are made to the appliance without our knowledge, or if the serial number on the appliance is removed or made illegible.

The annual service must be carried out by a competent installer in accordance with the advice given by Gledhill and using Gledhill approved parts.

(d) Stainless Steel Unvented Cylinders

Gledhill guarantee the components including controls, valves and electrical parts for two years from the date of purchase. IT SHOULD BE NOTED THAT THE FACTORY FITTED TEMPERATURE AND PRESSURE RELIEF VALVE MUST NOT BE REMOVED OR ALTERED IN ANY WAY OR THE GUARANTEE WILL NOT BE VALID. GLEDHILL WILL NOT BE RESPONSIBLE FOR ANY CONSEQUENTIAL LOSS OR DAMAGE HOWEVER IT IS CAUSED.

The guarantee for the stainless steel vessel is for twenty five years if the original unit is returned to us AND PROVIDED THAT:

(i) It has been installed as per the Design, Installation & Servicing Instructions, relevant standards, regulations and codes of practice.

(ii) It has not been modified, other than by Gledhill.

(iii) It has not been subjected to wrong or improper use or left uncared for.

(iv) It has only been used for the storage of potable water.

(v) It has not been subjected to frost damage.

(vi) The benchmark log book is completed after each annual service.

(vii) The unit has been serviced annually.

It should be noted that the guarantee does not cover:

- the effects of scale build up
- any labour charges associated with replacing the unit or parts.

If the stainless steel vessel proves to be defective either in materials or workmanship we reserve the right to either repair or supply replacements or the closest possible substitute in the case of any obsolete product and will collect and deliver to any address in England, Scotland and Wales (excluding all islands):

(i) free of charge during the first year after delivery by us.

(ii) thereafter at a charge of one twenty fifth of the then current list price during the second year after delivery by us and increasing by a further one twenty fifth on the second and subsequent anniversary of delivery by us.

ACTION IN THE EVENT OF FAILURE

If the stainless steel cylinder develops a leak we will ask for a deposit against the supply of a new one. This will be refunded if the failure is within the terms of the warranty when it has been examined by us.

(e) Solar Panels and ancillary equipment

Gledhill provides a five year warranty for defects in the collectors (except broken glass and collector accessories eg metal edgings). If the collector demonstrably fails to meet one of the requirements of the standard DIN 4757 part 3 we will replace it free of charge based on the date of invoice. We can not be responsible for damage caused by mechanical stress and/or changes caused by weather related influences. The warranty excludes minor surface damage that does not affect performance or malfunction due to improper assembly or installation.

Please note:

- Installation must have been carried out by a licensed specialized company (heating contractor or plumber) following the version of installation instructions in force.
- Gledhill or its representative was given the opportunity to check complaints on site immediately after any defect occurred.
- Confirmation exists that the system was commissioned properly and that the system was checked and maintenance was performed annually by a specialised company licensed for this purpose.

(f) Components of our products other than Storage Vessels and Integral Pipework.

We will either extend to the purchaser the same terms of warranty as we are given by the manufacturer of the component or if the manufacturer does not give any warranty, replace free of charge any component which becomes defective within two years after the date of the delivery by us and is returned to us at the purchaser's expense but we shall not meet the cost of removal or shipping or return of the component or any other cost charges or damages incurred by the purchaser.

If the appliance manufactured by Gledhill incorporates a factory fitted scale inhibitor then during the period

of three years from the date of delivery Gledhill will replace, free of charge, any plate heat exchanger fitted in the appliance as original equipment in which scale formation occurs that materially reduces the effectiveness of the plate heat exchanger. This guarantee does not extend to any other component installed within the Gledhill appliance or elsewhere in the Purchasers domestic water system.

9.4.

9.4.1. In respect of goods supplied by us and in respect of any installation work carried out by or on our behalf, our entire liability and the purchaser's sole remedies (subject to the Guarantees) shall be as follows:-

(a) We accept liability for death or personal injury to the extent that it results from our negligence or that of our employees

(b) Subject to the other provisions of this clause 9 we accept liability for direct physical damage to tangible property to the extent that such damage is caused by our negligence or that of our employees, agents or subcontractors.

(c) Our total liability to the purchaser over and above any liability to replace under the Guarantees (whether in contract or in tort including negligence) in respect of any one cause of loss or damage claimed to result from any breach of our obligations hereunder, shall be limited to actual money damages which shall not exceed £20,000 provided that such monetary limit shall not apply to any liability on the part of ourselves referred to in paragraph (a) above

(d) Except as provided in paragraph (a) above but otherwise not withstanding any provision herein contained in no event shall we be liable for the following loss or damage howsoever caused and even if foreseeable by us or in our contemplation:-

(i) economic loss which shall include loss of profits, business revenue, goodwill or anticipated savings

(ii) damages in respect of special indirect or consequential loss or damage (other than death, personal injury and damage to tangible property)

(iii) any claim made against the purchaser by any other party (save as expressly provided in paragraph (b) above)

(e) Except in respect of our liability referred to in paragraph (a) above no claim may be made or action brought (whether in contract or in tort including negligence) by the purchaser in respect of any goods supplied by us more than one year after the date of the invoice for the relevant goods.

(f) Without prejudice to any other term we shall not be liable for any water damage caused directly or indirectly as a result of any leak or other defect in the goods. We cannot control the conditions of use of the goods or the time or manner or location in which they will be installed and the purchaser agrees to be fully responsible for testing and checking all works which include the goods at all relevant times (up to, including and after commissioning) and for taking all necessary steps to identify any leaks and prevent any damage being caused thereby.

(g) Nothing in these Conditions shall confer on the purchaser any rights or remedies to which the purchaser would not otherwise be legally entitled

10. LOSS OR INJURY

Notwithstanding any other provision contained herein the purchaser's hereby agree to fully indemnify us against any damages losses costs claims or expenses incurred by us in respect of any claim brought against us by any third party for:-

(a) any loss injury or damage wholly or partly caused by any goods supplied by us or their use.

(b) any loss injury or damage wholly or partly caused by the defective installation or substandard workmanship or materials used in the installation of any goods supplied by us.

(c) any loss injury or damage in any way connected with the performance of this contract.

(d) any loss resulting from any failure by the purchaser to comply with its obligations under these terms as to install and/or check works correctly.

PROVIDED that this paragraph will not require the purchaser to indemnify us against any liability for our own acts of negligence or those of our employees agents or sub-contractors

FURTHER in the case of goods supplied by us which are re-sold and installed by a third party by the purchaser it will be the sole responsibility of the purchaser to test the goods immediately after their installation to ensure that inter alia they are correctly installed and in proper working order free from leaks and are not likely to cause any loss injury or damage to any person or property.

11. VARIATION OF WARRANTY AND EXCLUSION

Should our warranty and exclusion be unacceptable we are prepared to negotiate for variation in their terms but only on the basis of an increase in the price to allow for any additional liability or risk which may result from the variation.

Purchasers are advised to insure against any risk or liability which they may incur and which is not covered by our warranty.

12. RISK AND RETENTION OF TITLE

(a) goods supplied by us shall be at the Purchaser's risk immediately upon delivery to the Purchaser or into custody on the Purchaser's behalf or to the Purchaser's Order. The Purchaser shall effect adequate insurance of the goods against all risks to the full invoice value of the goods, such insurance to be effective from the time of delivery until property in the goods shall pass to the Purchaser as hereinafter provided.

(b) property in the goods supplied hereunder will pass to the Purchaser when full payment has been made by the Purchaser to us for :-

(i) the goods of the subject of this contract.

(ii) all other goods the subject to of any other contract between the Purchaser and us which, at the time of payment of the full price of the goods sold under this contract, have been delivered to the Purchaser but not paid for in full.

(c) until property in the goods supplied hereunder passes to the Purchaser in accordance with paragraph (2) above.

(i) the Purchaser shall hold the goods in a fiduciary capacity for us and shall store the same separately from any other goods in the Purchaser's possession and in a manner which enables them to be identified as our goods.

(ii) the Purchaser shall immediately return the goods to us should our authorised representative so request. All the necessary incidents associated with a fiduciary relationship shall apply.

(d) the Purchaser's right to possess the goods shall cease forthwith upon the happening of any of the following events, namely :-

(i) if the Purchaser fails to make payment in full for the goods within the time stipulated in clause 4 hereof.

(ii) if the Purchaser, not being a company, commits any act of bankruptcy, makes a proposal to his or her creditors for a compromise or does anything which would entitle a petition for a Bankruptcy Order to be presented.

(iii) if the Purchaser, being a company, does anything or fails to do anything which would entitle an administrator or an administrative receiver or a receiver to take possession of any assets or which would entitle any person to present a petition for winding up or to apply for an administration order.

(e) the Purchaser hereby grants to us an irrevocable licence to enter at any time any vehicle or premises owned or occupied by the Purchaser or in the possession of the Purchaser for the purposes of repossessing and recovering any such goods the property in which has remained in us under paragraph (2) above. We shall not be responsible for and the Purchaser will indemnify us against liability in respect of damage caused to any vehicle or premises in such repossession and removal being damaged which it was not reasonably practicable to avoid.

(f) notwithstanding paragraph (3) hereof and subject to paragraph (7) hereof, the Purchaser shall be permitted to sell the goods to third parties in the normal course of business. In this respect the Purchaser shall act in the capacity of our commission agent and the proceeds of such sale :-

(i) shall be held in trust for us in a manner which enables such proceeds to be identified as such, and :

(ii) shall not be mixed with other monies nor paid into an overdrawn bank account.

We, as principal, shall remunerate the Purchaser as commission agent a commission depending upon the surplus which the Purchaser can obtain over and above the sum, stipulated in this contract of supply which will satisfy us.

(g) in the event that the Purchaser shall sell any of the goods pursuant to clause (6) hereof, the Purchaser shall forthwith inform us in writing of such sale and of the identity and address of the third party to whom the goods have been sold.

(h) if, before property in the goods passes to the Purchaser under paragraph (2) above the goods are or become affixed to any land or building owned by the Purchaser it is hereby agreed and declared that such affixation shall not have the effect of passing property in the goods to the Purchaser. Furthermore if, before property in the goods shall pass to the Purchaser under paragraph (2) hereof, the goods are or become affixed to any land or building (whether or not owned by the Purchaser), the Purchaser shall:-

(i) ensure that the goods are capable of being removed without material injury to such land or building.

(ii) take all necessary steps to prevent title to the goods from passing to the landlord of such land or building.

(iii) forthwith inform us in writing of such affixation and of the address of the land or building concerned.

The Purchaser warrants to repair and make good any damage caused by the affixation of the goods to or their removal from any land or building and to indemnify us against all loss damage or liability we may incur or sustain as a result of affixation or removal.

(i) in the event that, before property in the goods has passed to the Purchaser under paragraph (2) hereof, the goods or any of them are lost, stolen, damaged or destroyed :-

(ii) the Purchaser shall forthwith inform us in writing of the fact and circumstances of such loss, theft, damage or destruction.

(iii) the Purchaser shall assign to us the benefit of any insurance claim in respect of the goods so lost, stolen, damaged or destroyed.

13. NON-PAYMENT

If the Purchaser shall fail to make full payment for the goods supplied hereunder within the time stipulated in clause 4 hereof or be in default of payment for any other reason then, without prejudice to any of our other rights hereunder, we shall be entitled to stop all deliveries of goods and materials to the Purchaser, including deliveries or further deliveries of goods under this contract. In addition we shall be entitled to terminate all outstanding orders.

14. VALUE ADDED TAX

All prices quoted are exclusive of Value Added Tax which will be charged at the rate ruling at the date of despatch of invoice.

15. TRADE SALES ONLY

We are only prepared to deal with those who are not consumers within the terms of the Unfair Contract Terms Act 1977, the Sale of Goods Act 1979 and the Supply of Goods and Services Act 1982. Accordingly any person who purchases from us shall be deemed to have represented that he is not a consumer by so purchasing.

16. JURISDICTION

The agreement is subject to English law for products delivered in England and Scottish law for products delivered in Scotland and any dispute hereunder shall be settled in accordance therewith dependent upon the location.